

Defense AT&L



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Adaptive, Responsive, and Speedy Acquisitions

Defense AT&L interviews

Gen. David H. Petraeus

Commander, U.S. Central Command

ALSO

The Manager in the Muddy Boots

Analysis Paralysis

**Is 99.999%
Operational Availability Practical for
Department of Defense Systems?**

A New Way to Start Acquisition Programs

Opportunity Management

Integrated Master Plan Analysis

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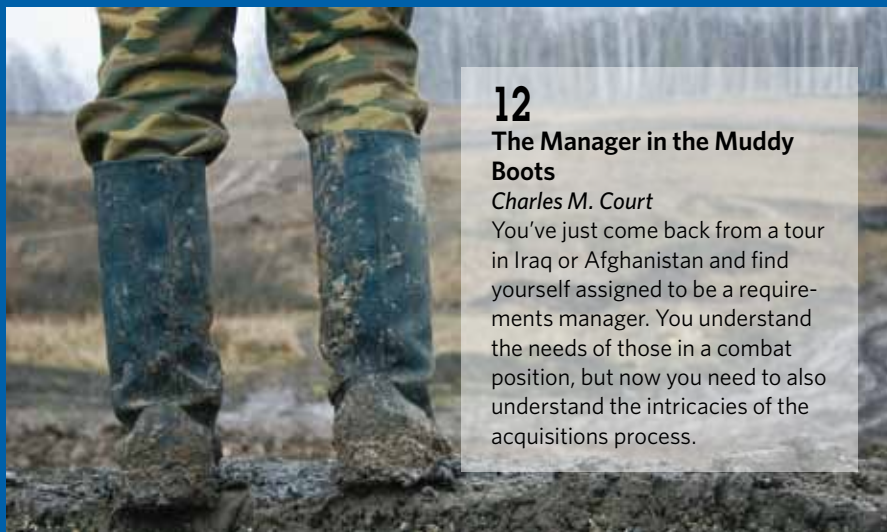
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Adaptive, Responsive, and Speedy Acquisitions

Gen. David H. Petraeus, Commander, U.S. Central Command

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Adaptive, Responsive, and Speedy Acquisitions

Gen. David H. Petraeus, Commander, U.S. Central Command



The enemy that the United States is fighting is unlike any enemy fought in the past, demonstrating different tactics, techniques, and procedures from those found in conventional warfare. To respond to that enemy, there is a greater need for speed, agility, and responsiveness. When a servicemember in Iraq or Afghanistan needs a tool or a service or a weapon, he or she needs it right away. The shift from conventional warfare to asymmetric warfare and overseas contingency operation changes the way the acquisition community provides its services to the warfighter. Gen. David H. Petraeus, commander, U.S. Central Command, discussed the requirements of the warfighters in the CENTCOM area of responsibility in an interview conducted by Frank Anderson, president, Defense Acquisition University. A video of the interview can be seen on the DAU Web site at <www.dau.mil>.

Q

Gen. Petraeus, I want to start off by thanking you for taking time out of your schedule to participate in this interview with us. In this first warfighter acquisition leadership interview, I would like to salute you as the U.S. CENTCOM commander. Also, on behalf of Dr. Ashton Carter, the under secretary of defense for acquisition, technology and logistics, I want to thank all of the soldiers, sailors, airmen, Marines, coastguardsmen, and civilians who are operating in harm's way to support our national security objectives and, more specifically, the counterinsurgency operation in your area of responsibility, especially Iraq and Afghanistan.

A

Well, it's great to be with you, Frank. It's a privilege. We have some important messages for some key people that I think we can get across during this interview, and again, I'm delighted to be with you.

Q

In going through your background, I recognize that you really are viewed as the father of our current doctrine for counterinsurgency. That was developed under your leadership when you were the commander of the Combined Arms Center at Fort Leavenworth, Ky.

A

Well, it was a big team effort, and we had a huge number of contributors. We were very privileged to have a good team, and a couple of us, I guess, were perhaps setting the cadence for that team.

Q

Yes, sir. What we'd like to do, through a series of questions here today, is to capture some of your lessons learned that we can transfer to our learning assets that will be used to prepare the acquisition workforce for counterinsurgency operations. So we will do this interview in two parts: First, we'll focus on acquisition support of counterinsurgency operation, and then, we'll get some of your thoughts and ideas about the role of leadership in our long-term success. I would like to start out with the first question: How has the paradigm shift, from a mindset of conventional warfare to asymmetric warfare and overseas contingency operation, impacted the delivery of products and services the acquisition community provides in your theater of operation?

A

Well, I think it has impacted in a couple of important ways. First of all, of course, with irregular warfare, we're literally facing different types of threats—different enemies who employ different tactics, techniques, and procedures. So rather than having tank-on-tank or large formations against other large formations, as in conventional warfare (the type that many of us prepared for for much of our careers), we're up against individuals who come at you in an asymmetric fashion—using improvised explosive devices, indirect fire,

and so forth; and they'll occasionally come out in some numbers and try to take our forces on directly, but more often than not, they have an indirect approach. And so, first of all, we have to recognize the nature of the threat—how it has changed—and having done that, we obviously have to provide our soldiers, sailors, airmen, Marines, and coastguardsmen the tools that are necessary to counter those particular threats. Second, we have to recognize that this is an enemy that adapts very rapidly: It's flexible; it is a learning enemy. It may be barbaric, it may employ extremist ideologies and indiscriminate violence and oppressive practices; but this is an enemy that learns and adjusts and adapts to what we do. So we have to, therefore, speed our processes. We can't use the traditional peacetime acquisition processes that some of us in the Army remember—the Abrams tank, and the Apache, and the Bradley, and so forth. We produced those after decades of development, test, acquisition, and all the rest of that. In this case, we see a threat, and we have to respond to it very rapidly, which means that all of our processes have to be much more rapid and much more responsive to meet the needs of those who are down range, putting it all on the line for our country.

Q

You seem to put a lot of emphasis on adaptability, speed, and responsiveness to a learning enemy that is very adaptable and agile in change. How critical is that?

A

It's crucial. Again, that is the enemy we face and also, by the way, these are the qualities that we need in our own leaders and troopers. In fact, we emphasize a great deal on having flexible, adaptable leaders who can recognize the changes that are taking place in their particular areas of responsibility and who can perform nontraditional tasks in the stability and support range. That's the kind of leader, that's the kind of trooper we need; and we need the processes that can enable them with what it is that is required to deal with the challenges they have in their particular areas.

Q

One of the big contributors from the acquisition community and counterinsurgency operations are contracting officers. What do you see as the major contributions of our contingency contracting officers operating in a counterinsurgency zone?

A

Well, they play very important roles. In fact, so important that when I was asked to go back to Iraq for a second tour after a very short time back here in the United States—which, in fact, even included a trip back to Iraq to do an assessment for several weeks of the Iraqi Security Forces—but when I was sent back to stand up the so-called "Train and Equip Mission," I asked the deputy secretary of defense for six contracting officers. I said, "I just can't envision being able to accomplish the mission that is established for us without having those individuals, and I know we're going to

need them right up front. So let's just go ahead and put the demand on the system," I told him, because what I intended to do was to have one of those in each of the six divisional areas in Iraq so that we could rapidly start developing the infrastructure and other construction programs that were necessary to support the effort we now know as the Multi-National Security Transition Command-Iraq. Indeed, we did hundreds of millions of dollars of contingency contract officer-contracted activities across the board—not just construction but also contracting for services, supplies, and the like. And again, their responsiveness, their ability to focus on what we needed in local areas and to get that job done very rapidly proved to be of enormous importance.

Q *Now-retired Maj. Gen. Darryl Scott [deputy commander, Task Force to Support Business and Stability Operations in Iraq, Office of the Deputy Under Secretary of Defense for Business Transformation; and deputy director, Defense Business Transformation Agency] is a very close friend of mine who actively supported you, and we've talked about a facts-based contract and how important that was to economic stability. Would you comment on that, sir?*

A Well first of all, he did a great job at the helm of what was called the Joint Contracting Command Iraq/Afghanistan, and that was a concept that we implemented over time as we basically established all of the structures that were necessary across the board in the Multi-National Force-Iraq;

and again, he did a great job leading the civilian as well as military contracting community that was part of that command in Iraq. What we were trying to do there was not just to satisfy the demands that we had for services, supplies, construction, you name it—whatever is contracted out—and to do it legally and absolutely, completely transparently above-board with lots of audits and all the rest. We also sought to do it in a way that could provide as many benefits to the Iraqi people as was possible. We sought to increase the number of Iraqi contractors after that number had gone down quite a bit because of concerns over their reliability. You know, when you have your mess hall blown up by someone masquerading as an Iraqi soldier—or whatever—there is a degree of understandable mistrust that is built in. And so first, we worked to get the Iraqis back inside with appropriate safeguards, searches, counterintelligence, and so forth. Then, the second was, let's do an Iraqi-first contracting concept. That was the big idea; let's help the Iraqis reestablish transportation networks. The Iraqi transportation network now is all over the country. It started with just a couple of companies ... actually, tribes. They were very important to rebuilding the infrastructure and the organizational structures within Iraq that could, over time, take over the responsibility for tasks that we were using Western contractors to perform. Really, the Iraqis had the capability; they had the human capital; they had the knowledge, the know-how. We just needed to give them the chance and, occasionally, we had to do a little bit of mentoring or advising when it came to business practices and so forth, but that has, I think, by and large been a success. It has helped inject into the Iraqi economy a substan-

tial amount of money that has therefore helped to give them a bit of a peace dividend, if you will, as the level of violence has come down very substantially in the wake of the Sectarian Violence of 2006-7. That has shown them that there are rewards out there when peace starts to break out. Again, I don't want to make light of the continuing security challenges in Iraq by any means because they are still very much there. But by comparison, they are vastly reduced, and they are at a level that permits commerce and construction and business to go forward.

Q *As I reviewed the field manual on counterinsurgency, one of the things that became very clear to me is that you need people in the theater who are in a continuous mode of learning, particularly as they move out to different locations*



Program managers have got to understand irregular warfare, and they have to understand it in specific circumstances where we are carrying out operations.

because the circumstances in one location are not necessarily what you will find in another. So the acquisition folks have to come in and be very adaptable to the conditions in different locations within the same area of operation. Would you comment about that, the requirement for adaptability?

A Sure. Well, I think it's true, as I mentioned earlier, of everybody who's operating in a regular warfare context, the conduct of counterinsurgency operations puts a premium on those who can learn faster than others, frankly. There's actually a comment in there that he who learns fastest ends up making progress and wins in the end in these kinds of struggles. And that is very true, and it is true also of all of those who are operating in local areas and have to appreciate the circumstances in a very nuanced fashion of those particular locales: the culture, the traditions, how the systems are supposed to work, how they really work, tribal networks, social organizing structures, local businesses who are the power brokers, all the rest of that—that has to be understood very clearly in quite a nuanced and granular fashion, because if you don't, you can end up contracting with folks who could be part of the insurgency. You could undercut the people that you are trying to support. Again, there are a whole host of challenges that have to be confronted by individuals who are working in counterinsurgency environments, and the challenges extend to those in the acquisition and contracting community as well.

Q *We've talked about contingency contracting officers. Would you share some of your thoughts on expectations for program managers who are delivering systems to support your area of operation?*

A Well, I think first of all, program managers have to understand the circumstances as well, and they have to have a sense of what is going on out there; that can only be achieved by going out there themselves, by talking to those who have spent a considerable amount of time out there, and by trying to develop lessons that mean something to them—to put into the hands of our troopers what it is that they need in these tough fights. So, they've got to understand irregular warfare, and they have to understand it in specific circumstances where we are carrying out operations. I think that's number one. Number two is never lose sight of who the ultimate customer is or the importance of providing that customer what he or she needs. And then, number three, never, ever underestimate how important speed is. We need what we need now. As a threat emerges, we need to counter it rapidly. We constantly see emerging issues that have to be addressed, and they have to be addressed rapidly. Again, this is not a peacetime endeavor; this is a wartime endeavor, and it has to have that degree of commitment—of persistence to battle the bureaucracy, to battle processes—to push through

We need the processes that can enable servicemembers with what it is that is required to deal with the challenges they have in their particular areas.



all those different requirements that might prevent the rapid provision of what our soldiers need.

Q *To take that to a little different level, I think what I'm hearing from you is that in many cases, you're better off getting an 80-percent solution today that you can use now instead of waiting months or another year to get a 100-percent solution.*

A That's very true. We're willing to test a solution as long as it is not something that is going to jeopardize the safety or lives of our troopers, we're happy to just have it come out there and let us try it. We had all kinds of one-offs, frankly, that were sent out to our troopers in Iraq, and I was fine with it. You really have different paradigms. Every one of these little bases, for example, every small patrol base or forward operating base needing station property, of all things, we would call it in the United States. Yet you don't have station property on a TOE [Table of Organization and Equipment], so we just went

out and bought stuff and said we'll see how these things work and our troopers can figure out how to operate them. And you know, if they were useful and helpful, they used them; if not, they parked them in the corner of the patrol base, and we got on with business. But that's the kind of attitude I think that you have to have, again, assuming that it's not going to jeopardize the safety or well-being of our troopers in that process.

Q

As we look at preparing people to move into theater—replacement individuals who are coming in—what advice would you provide for acquisition members who are taking a new assignment or coming in country to replace someone who's there? How do we prepare them so that they can be successful?

A

Well, I think first of all, you can virtually look over the shoulder of those who are down range. You can get on the Internet—secure Internet—and you can have lots of good discussion, you can have virtual communities, and these all exist in which there can be lots of batting around of ideas and, again, debates and discussions and so forth about what is needed, how best to meet those needs, how to negotiate the bureaucracies and the processes and the systems and so forth, and also how to understand them. So again, I think someone who's preparing to come out has to go through sort of a road-to-deployment process just as do our units. You know, our units ideally have a year; we start off with a counterinsurgency seminar for a week, and then they start down the road to deployment. Along the way, they have other seminars; they have lots of exercises. They have individual leader and collective and staff training along the way, and ultimately, they put it all together in a mission rehearsal exercise at one of our combat training centers. So frankly, we need to have similar processes to that as much as we can, recognizing that this is probably more about individuals than it is about even small units. But, with that caveat, there has to be this sense of a road to deployment and of preparation. Beyond that, I think it's hugely important to try to understand the circumstances in which what acquisition officers provide is going to be used. That means sort of understanding the irregular warfare battlefield, the areas of operation, local circumstances in different places, recognizing that what works up in regional command east of Afghanistan may not be so suited for regional command south and vice versa. What worked in Iraq won't necessarily be ideal, as we've seen with the MRAP [*Mine Resistant Ambush Protected*] vehicles—they're very large, quite heavy and wide, and they're terrific in Iraq; they saved countless lives there, but they're too large for the roads in many places in Afghanistan. And so the acquisition community is coming up with the so-called all-terrain MRAP vehicle. And I want to put in a plug for our under secretary of defense, Ashton Carter, because I surfaced an issue with him about the new all-terrain MRAP vehicle. The next day, he went out to Aberdeen Proving Ground, I think it was. They lined up all the MRAP vehicles, he drove them for himself, he agreed with the issues that we had surfaced, and on the spot, he directed changes be made. That's the kind of approach

we need. The issues had to do with the size of the windows, of all things, and the lack of sufficient visibility out of the new all-terrain MRAPs in an effort to save weight because of the weight of the ballistic glass, and so there has been an adjustment made as a result. There have been some other changes also. That's the kind of rapid acquisition, the rapid processes, the decision making that has to take place. We didn't convene a committee, we didn't have large meetings—we didn't have to do all those other things. Some of these issues you can see are pretty straightforward and you don't need to go through a lengthy process to direct changes. Dr. Carter didn't, and that sets a wonderful example for the entire community.

Q

As I listen to you, there is a clear emphasis and perspective on speed, agility, and delivering the equipment now.

A

Yes, well there is. Remember that I am one of six geographic combatant commanders. The world's divided up into these six regions, and we're the ones who are concerned with the region's most pressing near-term needs, so you have to balance our input, of course, with that of, say, a service chief who might be looking a bit farther out. That's the buyer beware label on the input that I'm providing here because I do recognize that there is, without question, still the need for the longer processes that result in the major programs out there that require the traditional steps in acquisition, compared with, say, the very rapid acquisition of some of the items that we've been able to field in very short periods of time to Iraq, Afghanistan, and elsewhere.

Q

I was reading an article over the weekend about Secretary of Defense Robert Gates, and it indicated that one of his big priorities and concerns is getting the right balance between the focus on fighting the current war—developing and delivering the equipment for the current fight—and the focus on fighting the future of the next war. And he's going back through as a part of his acquisition reform initiative to drive a better balance between the two, and I think that certainly would fit your comments here today.

A

Well, very much so, and I think that he's had this kind of input. I know he's had it from me in two different positions now, and I know he's had it from others of the geographic combatant commanders in particular. You have to prepare for the future; you have to devote a certain amount to the future. But you also have to win the wars you're in, and that means a focus on rapid acquisition—the quick response to the needs of our troopers. And Secretary Gates has done that. I can assure you that when we established the need for more unmanned aerial vehicles much more rapidly than they were going to be procured, he pushed and the system responded. When we identified the need for a V-shaped hull, which is now called the MRAP vehicle—and frankly, we could have had it sooner,

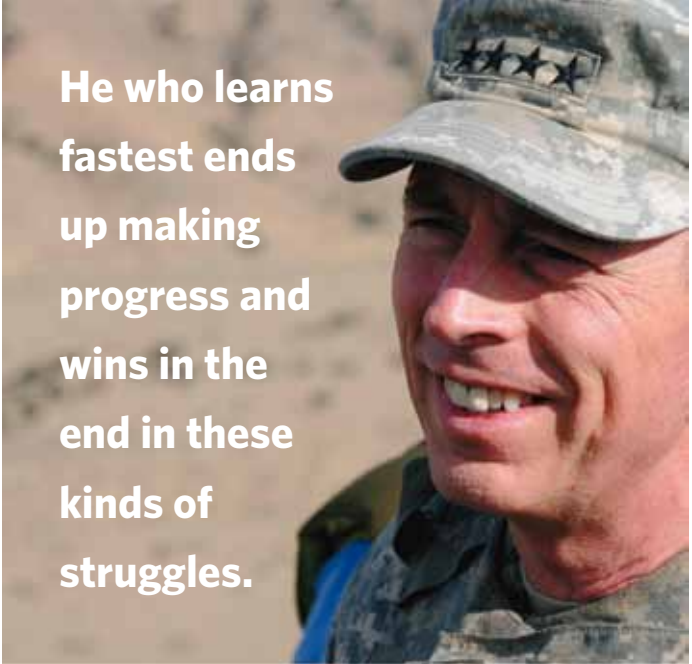
in my view. There were many of us who came home from second tours in Iraq and said, "We think it's time to do that." We were procuring them for the Iraqi military, and we identified shortcomings with the up-armored Humvee. But it took a while, again, understandably—this was still when these processes were in the period of adapting more rapidly, and then to their credit, the Services brought it all together. But certainly Secretary Gates' direction was a key catalyst and a pretty key factor in production of the MRAP vehicle, I can tell you.

Q *You have talked about some of the support that you've received from the acquisition community in terms of weapon systems. Are there any other specific examples?*

A Well, there are plenty of them. I think you go all the way back to the beginning—I mean you start with the individual soldier kit. The fact is that our soldiers used to spend hundreds of dollars—if not thousands of dollars in some cases—going to various military equipment stores right out the front gate, buying stuff that probably our military should have bought for them. And over time the military has, and it did it really quite quickly. Then, of course, there's the response to the counter improvised explosive device effort and the whole JIEDDO [Joint IED Defeat Organization] process. And again, pushing the very rapid response of industry in the acquisition community to get into the hands of our soldiers jammers, vehicles that can be used to probe for IEDs, and all the rest of this. Very, very important, and then it just keeps going all the way on up throughout the system; and then you have the services coming in and saying, "Geez, you know, if we put this pod on the F-16 or on this platform ... Let's see what we can do." And it just keeps going. And I think at a certain point, all of a sudden, this whole attitude, if you will, reached critical mass, and we had a chain reaction. And you had a situation where everyone was saying: "How can I help more rapidly? How can we identify the needs and immediately answer them? How can we again put into the hands of our troopers on the battlefield the tools that they need to deal with the threats they face?"

Q *Now I'm going to make a transition to a topic that I know is very, very important to you. I'd like to spend some time talking to you about leadership. But before we make that shift, would you take a couple of minutes and define your area of responsibility so that all of the people will understand the perspective that you bring from your personal experiences and the challenges in the U.S. Central Command area of responsibility—why it's critical that we get better at supporting?*

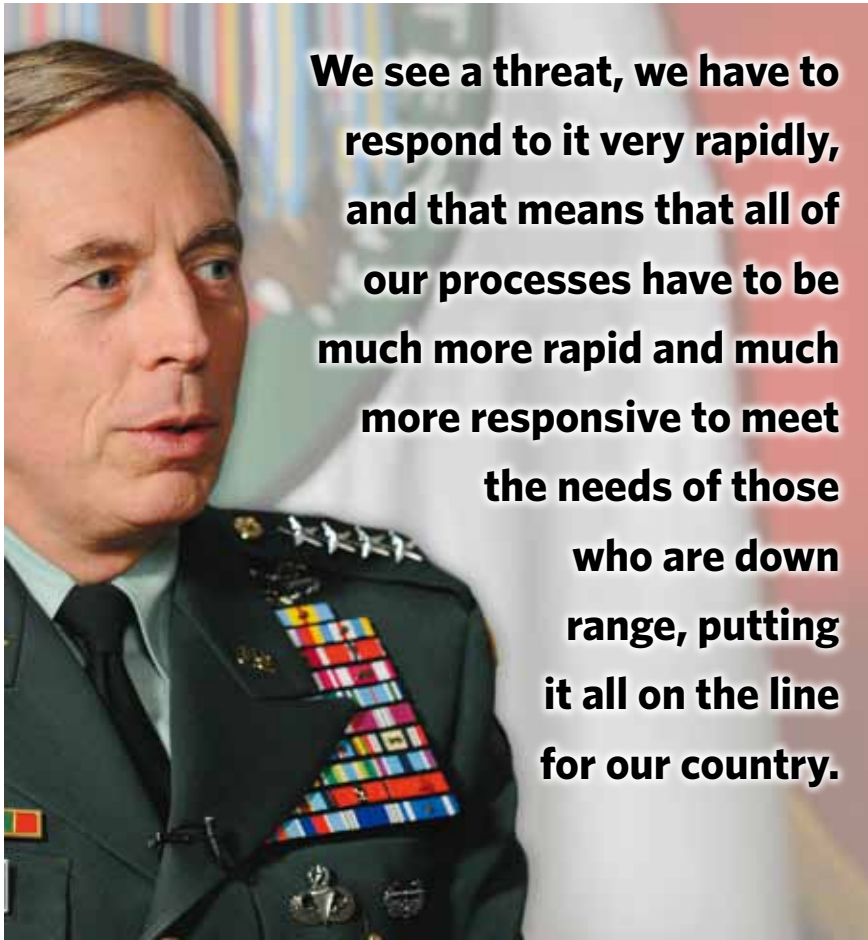
A Well, Central Command, first of all, is actually the smallest of the six geographic combatant command areas, but it has the lion's share of the problems, unfortunately. It is a region that stretches from Egypt in the west to Pakistan in the east,



**He who learns
fastest ends
up making
progress and
wins in the
end in these
kinds of
struggles.**

Kazakhstan in the north and then the waters off Somalia in the south; 20 countries all together, and well over 500 million people with all kinds of challenges and difficulties. It has the richest of the rich—a country with the highest per capita income in the world—and it has some of the poorest of the poor. It's a region of contrast; it's a region of friction between religious groups, ethnic groups, different sects ... even within different religions. It has unmet needs. It has everything from Al Qaeda and other transnational extremists and terrorist groups to Shia militants sponsored by Iran. It has the threat of proliferation of weapons of mass destruction mostly in Iran. It has, of course, the efforts, the wars, counterinsurgency operations in Iraq and Afghanistan, and the major support that we're providing in Pakistan as well. It has pirates; we're into counterpiracy. It has arms smugglers, illegal narcotics, industry kingpins, you name it and we have it. And we're privileged to have over 230,000 great soldiers, sailors, airmen, Marines, and coastguardsmen; tens of thousands of additional DoD civilians, and then hundreds of thousands of contractors of various skill sets. So it is a hugely important region to our country because of all that, and then you add in the fact that it has something like 60 percent of the world's proven oil resources and well over 40 percent of the world's proven natural gas resources. A very important region to our country, an area in which we're focusing an enormous amount of our most important resources, foremost among them are great young men and women who, I do believe, are the new greatest generation of Americans. It's also an area into which we are putting considerable treasure, needless to say, in terms of the sheer amount of money required to fund the operations in Iraq, Afghanistan, Pakistan, among others.

Q *As you describe your very broad area of responsibility, it's obvious that you can't oversee and do everything yourself, so*



We see a threat, we have to respond to it very rapidly, and that means that all of our processes have to be much more rapid and much more responsive to meet the needs of those who are down range, putting it all on the line for our country.

through endless campaign assessments, and they're hugely important. You have to talk to everyone from private soldiers on up to the four star subordinates that we have in the Central Command area of responsibility. You have to talk to locals; you have to talk to governments. Of course, we try to do everything with partners, not just partners from the region, but the partners from outside the region who are active in it, too. By the way, we have 60 countries represented by senior national representatives at CENTCOM headquarters alone. It's like a mini-United Nations. So, you develop the big ideas and get them as right as you can—and by the way, big ideas don't hit you in the head like Newton's apple when you're sitting under a tree. More likely, you get a little seed, and that builds, and you slap another tiny idea on it. And you keep forming it, shaping it, modifying it, refining it, trying it out, throwing it against the wall; intellectually having people challenge it, having strategic assessments and all the rest, and gradually, the big ideas start to come together. So we've got the big ideas, we've communicated them as effectively as we can, we're overseeing their imple-

leadership and the development of leaders are critical to your success. Would you describe some of the key leadership skills and your approach to mentoring your subordinate leaders?

A First of all, I probably should've pointed out as well that I've been in the Central Command area of responsibility almost nonstop now since we went into Iraq in March of 2003—or flew over it in the case of the 101st Airborne Division Air Assault. And I commanded the division there, then the Train and Equip Mission, then Multi-National Force-Iraq, and now Central Command Headquarters.

I sat down early on and said, "Well gee, what should our headquarters do and what should I try to do?" I think it's important to recognize that leaders—really at all levels, but particularly at strategic levels in larger organizations—have these issues of very significant command structures. I think that we have four big responsibilities. The first is to get the big ideas right; to get the overall concepts correct. The second is to communicate those big ideas throughout the breadth and depth of your organizations; not just to your subordinate leaders and their subordinates, but to have them echoed and reechoed all the way down through all of the elements that you're privileged to oversee. Third, you have to oversee the implementation of the big ideas, so you've got to get out there. You have to be on the ground; you have to sit

mentation, and then the last task is to identify best practices; identify lessons that can be learned only by incorporating them into the big ideas that have to be communicated and over which you have to see the implementation.

So all of this—these four tasks—I think are the key really to leadership in any organization. And you have to spend a heck of a lot of time up front, trying to get those big ideas right. When we did the surge in Iraq, for example, the surge was not just 30,000 more U.S. forces or 125,000 more Iraqi forces that were added to the rolls during that time. The surge really was about the employment of those forces and all of them. It was about changing the focus of all of our forces together, all coalition and Iraqi forces, to emphasize security of the population, serving the people, reconciliation (you know, you can't kill or capture your way out of an industrial strength insurgency), living our values, being first with the truth in our strategic communications, and then that final one, which is always learn and adapt.

Another key thought is the encouragement of initiative. You have to create an environment in which leaders at small unit levels, the so-called strategic lieutenants—we call them that because lieutenants carrying out tactical tasks can often have strategic effects—have to be aware of the context within which they're operating so that they can do all that they can do to try to make those positive effects, not just at

the tactical level but at the strategic level as well. And they have to have a sense that they not only can but should exercise initiative within the intent of the big ideas as they filter down to their level, augmented obviously by subordinate leaders adding to those big ideas and ensuring that they're appropriate for the local circumstances in which the small units are operating. These are some of the thoughts, if you will, as we sat down, for example, after the change of command at Central Command and tackled what we thought we needed to do to meet our responsibilities to the subordinate units, to our troopers, and also obviously to our country and to our commander in chief.

Q You mentioned the strategic lieutenants, which really is an interesting concept. What are the leadership traits that you look at and you believe are important in identifying the young officers who are showing the attributes that will move them through to senior leadership position?

A Well, I think first of all, there is seriousness about their profession. There is a degree of commitment to truly master the responsibilities of whatever branch or service the individual is in. There is a degree of energy and vision that leaders have to provide. And as people move along, assuming they're fit and they have some qualities to inspire their troopers, over time, I think you start to look at whether they have the added dimensions of brains, judgment, and the ability to communicate. And those, I think, over time, are what start to become more and more important assuming that the individuals have all of the entry-level skills and qualities. In other words, they're physically and mentally tough; they have discipline; they're serious about their job; they're studying their profession; they're trying to master it; and they're meeting their responsibilities to their troopers. And then you're starting to figure out who's the person to whom I turn when I really want some advice from lower levels? Whose judgment do I ride in a really tough spot? Who do I ask to communicate vision, ideas, and so forth to others? You start to get into those qualities, and I think that those are qualities that are developed over time from a host of different perspectives and through different ways.

Obviously, you have your formal military schooling, you have the experience, you have self study, and I'd add another experience that I would call "out of one's intellectual comfort zone" experiences. For me, it's like going to a civilian graduate school after actually being at the Command and General Staff College, where we thought we had very vigorous debates and big differences of opinion. You go to a civilian graduate school, and you find out the differences that we had were about like this in relative terms to the differences that you will find on any civilian campus of reasonable note. And that is a very salutary experience; it is a very challenging experience intellectually. It is a very good experience to have had before you go into cultures and places that are

very different from our own and experience different people. You know, it was very interesting in Iraq in the early days. We'd walk through the streets of Mosul once 101st was up there and the people would come up to us and say, "We love America. We love you. We love democracy." And if you hadn't gone through some of these kinds of experiences, that could throw you for a loop. But if you've had that kind of debate in other circumstances along the way, I think you find that those developmental experiences are of enormous value.

Q Now you mentioned the schooling, and I would just like to highlight here that you do have a master's degree in public administration and a Ph.D. from Princeton University's prestigious Woodrow Wilson International Relations School. How did that help prepare you for your current assignment?

A Oh, it was of incalculable value. I went to the Woodrow Wilson School because it had fewer military folks than some of the competition. I figured if I'm going to go out there and throw myself into this challenging position, I might as well go to a place that has all of the qualities and attributes of our very finest institution for this combination inter-disciplinary program of international relations and economics. But it also doesn't have too many military folks, so I'm not going to be able to hide behind my Airborne buddy here or a bunch of military fellows more senior to me. I'm going to have to stand on my own two intellectual feet. And it was an enormously challenging experience, I can tell you; very, very difficult at times, but enormously rewarding as well. I think it did help a great deal. By the way, this is not to say that our military schools are lacking in any sense. We just have to be realistic about the fact that in military schools, when you go to the coffee pot, you're generally going with folks who are in uniform or at least are from the inner agency, and it's a little bit less challenging than if you're going to the coffee pot with the representative of an organization that has a very different view about folks in uniform than do most of us. And I think that prepares you pretty well for some of the spots in which you might find yourself down the road.

Q In your environment, as you've discussed, you have a huge collaboration requirement mission—60 nations—and that requires that you be a diplomat. You have to be a statesman at the same time that you're a warfighter leading a very important mission for our national security. Would you describe a little bit about how you have dealt with your responsibilities and how you prepare to operate successfully in a dynamic environment of change where you have to confront complexity every day, and where everything that you think today could possibly change tomorrow? How do you prepare for that?

A Well, first of all, I think you have to be prepared to be com-

mitted to it. This is a nonstop endeavor. It's not an endeavor that recognizes weekends or holidays. The enemy is oblivious to that; world events are oblivious to that. This is a pretty consuming endeavor when you step into it.

Second, you spend an enormous amount of time every day devouring reams of information, intelligence from all different sources, information (in some cases, raw) from every avenue that you can find. And you cultivate, I think, a circle of friends, acquaintances, academic colleagues—you name it—who are going to challenge you on a periodic basis as well, and who don't know you as Gen. Petraeus. They know you as Dave, and they're not intimidated by the four stars on your shoulder because they used to go running with you. So, I think the big issue is just constantly trying to remain on top of the developments, and you can

do that only by devoting enormous amounts of time to constantly monitoring and then actually seeing for yourself and experiencing and talking to those on the ground to get the kind of feel. I feel like the man in the circus who runs around. You know, he gets a plate spinning, and he puts it down and then he goes over gets another one; then he comes back to this one, gives it a couple more spins, and then he gets another—and pretty soon he's got a whole bunch of different plates spinning. I think that's the life of a geographic combatant commander, or many different walks of military life, certainly. But that's certainly the way we feel about what it is that we're trying to do. We're trying to keep a lot of plates spinning to keep the really important ones going at a particularly high rate of speed and not to let the important ones fall on the ground.

Q *The audience that will consume this message consists primarily acquisition workforce members. Do you have any thoughts relative to unique or special leadership attributes that you'd like to see in the acquisition leaders who are coming into theater?*

A Well, I think that they've have to stay current with the situation on the ground. We have a unique circumstance for those who are in uniform in the acquisition community, in some cases, may not have served in a unit actually in a combat environment in a number of years—if ever. So it's hugely important

that once they've raised their hand and said, "I want to go into the acquisition community," that in addition to mastering the very arcane and challenging field that they've chosen, they still remain very much in touch with their roots. And they keep a sense of what it is that is going on out there and stay very close

to those who are actually using what the acquisition community is putting in their hands. And I think the best of those that I've seen over the years are those who are out there on the ground—out there experiencing what our troopers are doing—and who are trying to get their feel for what it is that's needed so that they can translate what may or may not be the clearest of urgent operational needs statements into a piece of equipment or some other element that we're going to purchase.

Q *Gen. Petraeus, we appreciate your sharing your time. Is there anything else that you'd like to say?*

A It's been a privilege to be with you, and I wouldn't have done it if I didn't think it was a very important topic and that the community that will read it is of enormous importance to those who are out there putting it all on the line for our country. And so I want to thank them for what they are doing to—as rapidly as possible—provide what is needed out there as quickly as we identify it to them. Thanks very much.

Q *Sir, on behalf of Dr. Ashton Carter and the entire acquisition workforce, I thank you again for taking the time today as I mentioned, but more importantly, I thank you for your leadership and the sacrifices that you and your family have made. I also would like to thank the soldiers, sailors, airmen, Marines, coastguardsmen, and civilians who have served in your area of operation and have also made great sacrifices for our national security and to ensure that we are successful in this mission that you've taken on.*

You have to prepare for the future; you have to devote a certain amount to the future. But you also have to win the wars you're in, and that means a focus on rapid acquisition—the quick response to the needs of our troopers.

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The Manager in the Muddy Boots

Charles M. Court

Imagine flying a plane, serving on a ship, or commanding a ground convoy. Make it challenging; make it real. Put yourself in some tough situations in Iraq or Afghanistan.

What must race through your mind every day of your assignment? For example, would you worry about conditions in the combat environment, the geography, the threat, the rules of engagement, the other people in your unit, doctrine, policy, facilities, and the overall mission? Yes, you would worry about all of that and more. Any combat job is a tough job. You want to do the mission, and you want to get yourself—and the rest of your unit—back home OK.

Court is the director of requirements management training at the Defense Acquisition University.

When you return, you receive congratulations on your successful operational tour and a transfer to a more peaceful assignment. Now you need to apply your previous combat experience to your new position as a requirements manager. In addition, you quickly need to understand the Joint Capabilities Integration and Development System (JCIDS); the planning, programming, budgeting, and execution (PPBE) system; and the Defense Acquisition System (DAS) so you can communicate the warfighters' requirements. The men and women now in the field count on you to represent them. They need new systems and the best, most reliable technology to complete their missions, to counter the threats, and to come home safely.

The Point of View From the Field

So who is this manager wearing boots covered with mud (or dust or salt water), who may be still in the field or freshly arrived from an operational assignment? Who is this requirements manager? How does the requirements manager help acquisition? At the same time, how does the requirements manager help operational units facing new, dynamic threats?

The formal definition is that the requirements manager is a military manager or Department of Defense civilian manager charged with assessing, developing, validating, and prioritizing requirements and associated requirements products through the JCIDS process. But this definition fails to mention four key points.

First, no one person does all four tasks of assessing, developing, validating, and prioritizing. Managers, specialists, and decision makers assume different tasks within the formal definition. While their current combat experience is critical, requirements managers fresh from operational assignments will need to work with those who have limited or dated operational experience.

Second, the requirements manager is the warfighters' representative within the "Big A" processes of JCIDS, PPBE, and DAS. New requirements managers, fresh from the field, may be rich in operational experience, but they need to be able to function in the elaborate and confusing Big A acquisition processes. They must interact with managers who are well-versed in their specialties within acquisition and budgeting.

Third, because current operational experience is critical, requirements managers remain responsible for stating and defending capability gaps, for collaborating in developing requirements documents, and for helping move those documents through all three DoD systems.

Finally, requirements managers remain responsible because operational feedback will continue to come directly from units in the field. In turn, requirements managers remain accountable to the field units to ensure Big A acquisition meets the warfighters' needs.


Getting the three systems—JCIDS, PPBE, and DAS—to work together is not easy. Most senior program managers and budgeting personnel have often spent years learning the intricacies of acquisition and PPBE. Coming straight from a field assignment, requirements managers usually have a very short time to switch from the challenge of operations to the pitfalls of acquisition, financial management, and documenting requirements. That switch can become especially challenging when the requirements manager encounters specialists with outdated information, obsolete points of view, or outright inflexible approaches. Forcefully demanding things will not help solve the challenge of dealing with other managers with conflicting priorities. To be effective, managers within all three systems must recognize how they can work together.

Getting the Three Systems Together

All too often, requirements managers begin at a disadvantage. Because assignments tend to be short, military managers are often on a short tour before either going back to the field or retiring from the Service. Civilian requirements managers risk losing their insight into field conditions as their assignments keep them from the most current operations. In either case, the requirements manager with limited training and scant acquisition experience must interact with trained specialists and experienced experts in confusing disciplines such as acquisition, systems engineering, finance, and contracting. Any naïve hope that everyone will agree on how to support warfighters quickly evaporates.

Recall that the three key processes of JCIDS, PPBE, and DAS must work in concert to deliver capabilities to the warfighter. The analysis, requirements generation, and document validation processes of JCIDS may seem worlds removed from operational experiences. The requirements manager needs to learn to master the needs-driven requirements-generation process, but problems begin to multiply when JCIDS-generated requirements mesh with the event-driven acquisition process and the calendar-driven budgeting cycle. Working in concert ultimately comes down to people working together and doing their best to make their respective system work with the other systems to deliver reliable, effective military hardware.

So how do the best requirements managers get JCIDS, PPBE, and DAS work together? The best managers in all three areas have experience, education, and mutual respect towards managers in the other disciplines. Unfortunately, mutual respect and understanding can break down, and those breakdowns waste time and opportunities. In the worst situations, managers find themselves almost speaking different languages because of differences in education, training, priorities, and points of view sharpened by various hard-earned experiences. The requirements managers fresh from the field need insight into all three management systems to be effective.



**Acquisition professionals
can best serve the warfighters
by working with the
requirements manager who
is wearing boots covered with
mud fresh from the field.**

Situation Awareness, Requirements Creep, and the Central Problem

Such insight must combine into something akin to situational awareness, which is so important in an operational situation. Recall everything a warfighter must consider in an operational situation (conditions in the combat environment, the geography, the threat, the rules of engagement, the other people in your unit, doctrine, policy, facilities, and the overall mission). Understanding system capabilities, the operational environment, and the current state of affairs is not unlike having a situational awareness of the different Big A acquisition systems, the possible scheduling disconnects, and the overall goal. As the military services strive to make their training more effective in land, sea, and air operations, combat-experienced requirements managers may prefer live-fire situations to the initial confusion of facing the meetings, reviews, and documentation of JCIDS requirements generation. Orchestrating the three challenging elements of Big A acquisition requires requirements managers either to develop the requisite situational awareness quickly or to risk losing opportunities to make the acquisition system more effective.

Another common problem is requirements creep. As a program successfully moves through the three systems, other specialists and other managers all too often try to add requirements in the forms of new capabilities and missions. Many managers have experience in which a 10 percent increase in range or a few more knots of speed result in dramatically higher costs, extended schedules, and reduced numbers of operational systems. The problem of

requirements creep gets worse when modifying requirements leads to unanticipated second- and third-order effects. Expanded requirements can also compel implied or derived requirements such as new manufacturing techniques or different environmental conditions. The temptations associated with requirements creep will probably never go away, but the requirements managers must be aware of those temptations so the acquisition system makes timely deliveries of effective, affordable hardware solutions.

The central problem remains communications breakdowns. Industry leaders have often complained about individual management units making decisions in the absence of communications with other units. For example, car designers would send their design to the manufacturing unit, and the manufacturing unit would expect marketing to sell whatever came off the assembly line. The manufacturers would often state that they could streamline manufacturing and hold down costs if they had input into the design process. The marketers would note that they could sell more if

the designers and the manufacturers had better insight into the sales market. DoD cannot permit the three elements of Big A acquisition to operate independently; the threat is too dynamic and the stakes are too high. Preparing requirements managers has become a priority for the under secretary of defense for acquisition, technology and logistics because DoD recognizes the need for JCIDS, PPBE, and DAS to work together.

As the requirements manager faces managers and decision makers with different points of view, he must strive for streamlined communications to keep the various processes focused. Every Big A manager and decision maker must ultimately agree on what the warfighters need; otherwise, capabilities will never reach the warfighter. Thus, the requirements managers need to know the terminologies and the procedures within all three components of Big A acquisitions. Even managers in the same military service cannot communicate without a common terminology. Understanding and applying the knowledge of different procedures combines with timing inputs into the system—inputs such as analysis results and requirements documents—so those contributions lead to developing effective solutions.

What DAU is Doing

Section 801 of the 2007 National Defense Authorization Act (NDAA) tasked the under secretary of defense for acquisition, technology and logistics, in conjunction with the Defense Acquisition University, to develop requirements management training. Under this mandate, for the last two years, DAU leaders have been mindful that the requirements man-

agers need to become familiar with current DoD priorities, terminology, and procedures quickly and comprehensively. That awareness led to the development of the online learning module, Capabilities-Based Planning (CLM 041), and the distance-learning course, Core Concepts for Requirements Management (RQM 110). The courses begin the requirements manager certification process that will continue with a proposed classroom course, RQM 310 (course name to be determined). General officer- and Senior Executive Service-level certification will remain available through the existing course, Requirements Executive Management Overview (RQM 403).

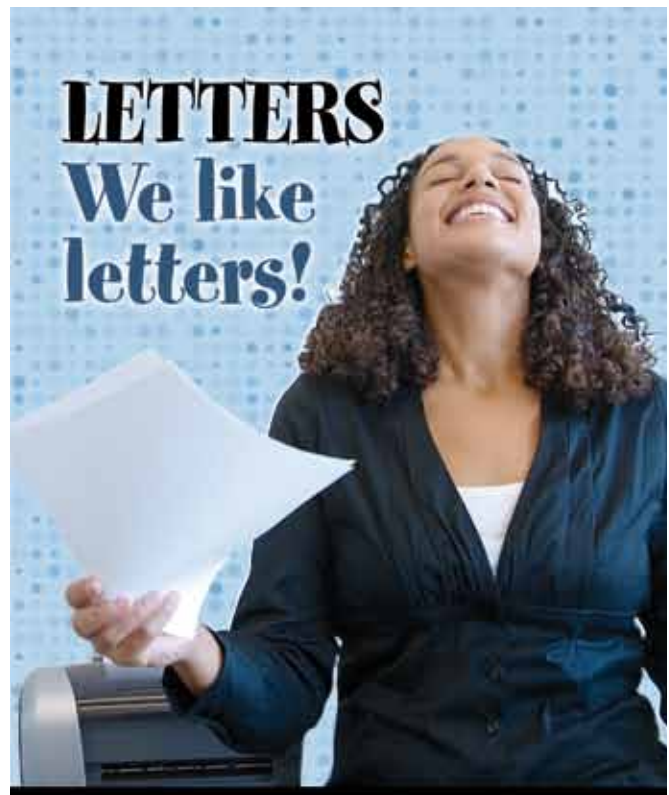
To bridge the gap between introductory-level RQM 110 and the advanced-level RQM 310—and to offer just-in-time training—the DAU Requirements Training Directorate has proposed developing three requirements management learning modules: Requirements Tradeoffs (CLR 160), Capability-Based Assessments (CLR 250), and Developing Requirements (CLR 252). CLR 160 will help students understand how changing or adding requirements leads to higher costs and to scheduling delays. CLR 250 places emphasis on how the JCIDS depends on analysis to determine systems' requirements; and it will help potential capability-based assessment team leaders and team members organize an assessment, evaluate the quality of an assessment, and determine the appropriate follow-on efforts. CLR 252 will help students apply capability-based assessment results to develop key performance parameters for new systems.

How Important is This Effort?

Serving the warfighter is the requirements manager's mission, and it contributes to the protection of our nation. That combined with the requirements manager's experience and insight make the requirements manager the essential warfighters' representative. All in DoD must ensure Big A acquisition addresses the capability deficiencies the requirements manager identifies. Warfighters regularly face adversaries who are constantly seeking to expand and exploit their advantages. The acquisition community develops, acquires, supplies, and maintains needed tools and services so warfighters have the best, most reliable equipment. Although program managers, test managers, and intelligence experts may have extensive operational experience, the most current knowledge comes from the troops in the field and troops returning home from operational tours. Those returning troops are our most valuable resource to get JCIDS, PPBE, and DAS to work together to meet the warfighters' needs.

All said, acquisition professionals can best serve the warfighters by working with that new manager, the requirements manager, who is wearing boots covered with mud or with salt water or with dust fresh from the field.

The author welcomes comments and questions. You can contact him at charles.court@dau.mil.



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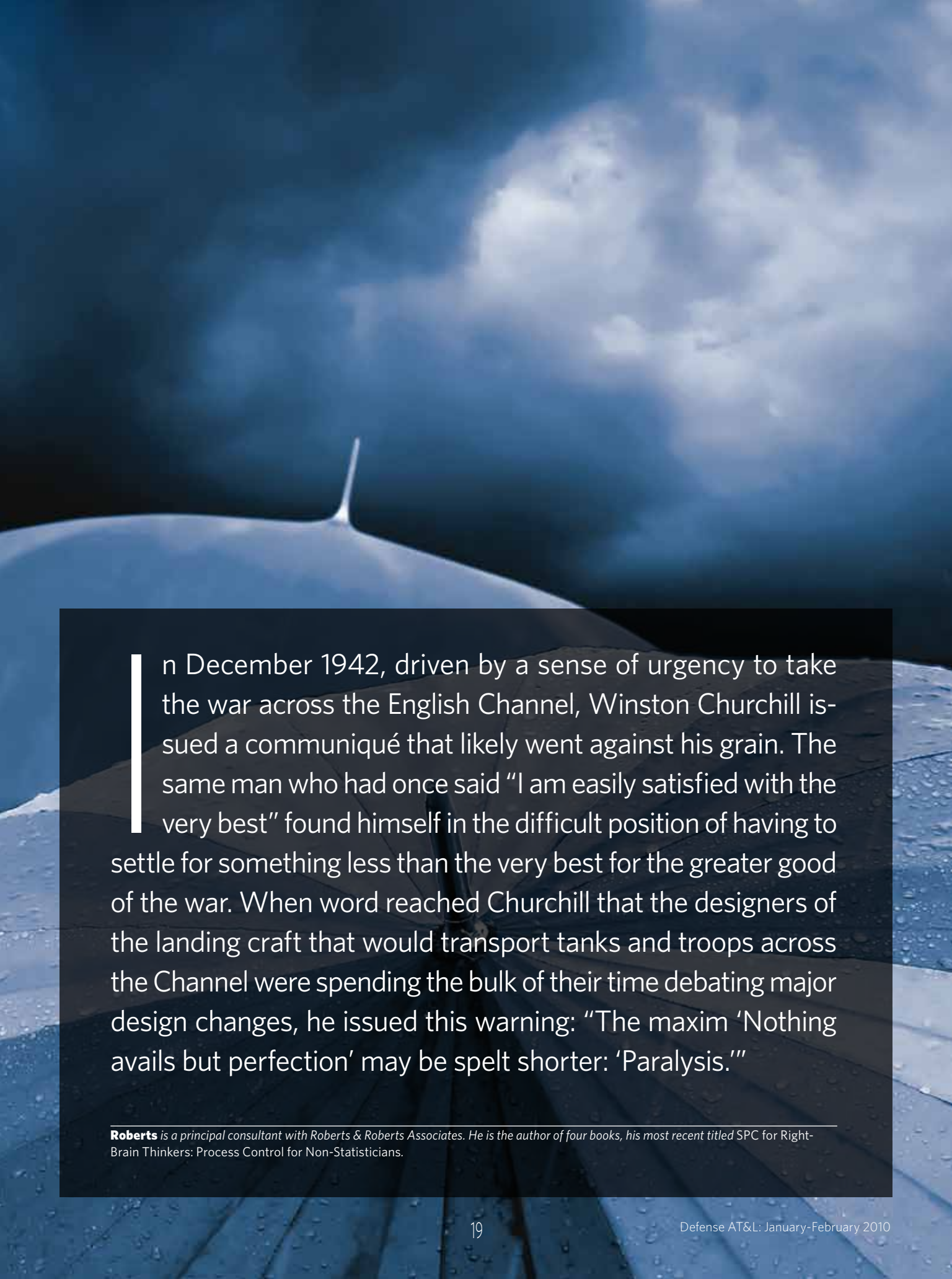




Analysis Paralysis

A Case of Terminological Inexactitude

Lon Roberts



In December 1942, driven by a sense of urgency to take the war across the English Channel, Winston Churchill issued a communiqué that likely went against his grain. The same man who had once said “I am easily satisfied with the very best” found himself in the difficult position of having to settle for something less than the very best for the greater good of the war. When word reached Churchill that the designers of the landing craft that would transport tanks and troops across the Channel were spending the bulk of their time debating major design changes, he issued this warning: “The maxim ‘Nothing avails but perfection’ may be spelt shorter: ‘Paralysis.’”

Roberts is a principal consultant with Roberts & Roberts Associates. He is the author of four books, his most recent titled *SPC for Right-Brain Thinkers: Process Control for Non-Statisticians*.

A clear case of analysis paralysis! Or is it? A second look at Churchill's wording reveals that a more apt characterization is perfection paralysis—the failure to act when the need for action trumps the quest for perfection. Whether or not hindsight supports Churchill's outlook, this is how he perceived the situation at the time.

Though all of this may seem like semantic hair-splitting, I would argue that the distinction matters, certainly if finding and treating root causes is important. And despite advancements made in program and project management since the 1940s, perfection paralysis is still very much alive and well. Furthermore, it is nurtured by the same “Nothing avails but perfection” mindset that Churchill took issue with—a mindset that positions itself as the moral high road to which all should aspire.

Labels are a communications necessity and convenience. But labels can also be detrimental when they are close but slightly off the mark. Encountering an instance of this early in his career, Churchill coined the expression “terminological inexactitude”—a play on words alluding to the misapplication of labels and, by extension, the damage that can be done by engaging in this practice. I submit that analysis paralysis is likewise an instance of terminological inexactitude, making it difficult to distinguish between the various conditions that fall under the umbrella of this label.

In the remainder of this article, I will examine three problematic conditions that are often attributed to analysis paralysis. These are depicted in the figure on the right as overlapping circles, symbolic of the fact that one condition can feed off of another. In the spirit of Churchill, I have also concocted somewhat grandiose but descriptive labels for the three conditions: Analysis Process Paralysis, Risk Uncertainty Paralysis, and Decision Precision Paralysis.

The Analysis Carousel Riders

When the expression analysis paralysis is mentioned, an image that springs to mind is something akin to getting stuck on an analysis carousel. Hop on board, drop in a coin, and continue riding in circles, at least until the coins are exhausted or someone pulls the plug. It's all about the ride itself—the sights, the sounds, the ambiance, the indescribable exhilaration that comes from crunching numbers, then crunching them some more. True devotees never tire of the ride. Like the Hotel California in the Eagles song, they can check in, but they can never check out. Or so it seems!

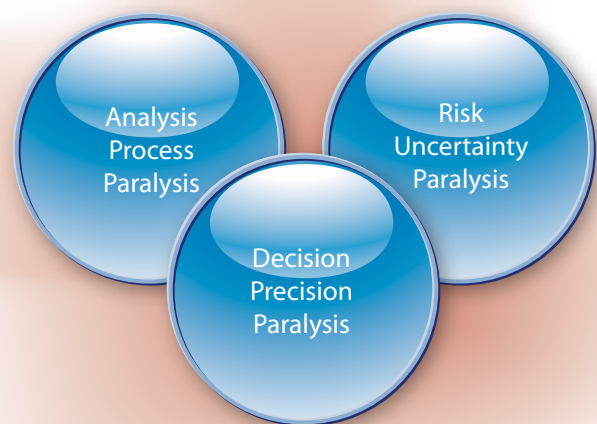
The situation described is representative of the condition I call Analysis Process Paralysis. Of the three conditions I will examine, it is closest to what analysis paralysis has come to mean in popular parlance. Though it may appear to afflict the one doing the analysis rather than the one relying on the analysis, its tentacles can be hard to escape, especially when the stakes are high and the decision

maker is uncomfortable working with less-than-perfect information.

Certainly it's possible to enjoy the process of analysis without falling into the Analysis Process Paralysis trap. Nevertheless, Analysis Process Paralysis feeds on a fascination with analytical techniques. And it is abetted by an array of technology tools that can crunch vast amounts of data, create dazzling displays, and induce a degree of sensory exhilaration on par with that of slot machines and video games. Like all specialists, data analysts do best what they do most. It's called experience, and it is invaluable. But also like all specialists, data analysts are inclined to do most what they do best—and that's where problems can arise.

Some managers may be willing to work around those who fit that description, assuming their history for getting results outweighs any personal eccentricities. Unacceptable are the few (we would hope) whose narrow view of their role causes them to be less concerned with garbage in/garbage out than they are with the time spent between in and out. Those fitting that description are apt to rely on others to ask the right questions and feed them the data they need to do their thing. Questions regarding the source, integrity, or completeness of the data may not concern them as much as it should. Their job, as they see it, is to work with the data they are given.

Analysis Paralysis



Ultimately, the responsibility for avoiding Analysis Process Paralysis rests on the shoulders of the affected decision makers. After all, perpetrators of Analysis Process Paralysis aren't likely to recognize it as a problem in the first place. Decision makers should also be aware of their contribution to Analysis Process Paralysis—in particular, the role that risk aversion and indecisiveness on their part plays in fostering this condition.

This discussion brings us to the following suggestions for dealing with Analysis Process Paralysis:

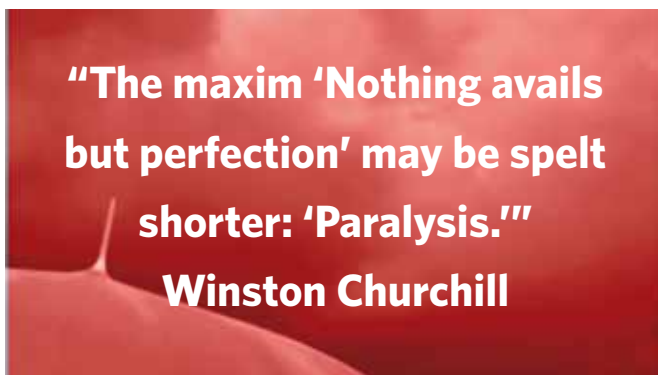
- **Expectation Clarification:** Clarify in your own mind the questions you would like to have answered as a result of analysis and clearly communicate this to all who are involved in the analysis process.
- **Stop Signs and Checkpoints:** Set realistic, unambiguous deadlines for obtaining results from the analysis process; also request status and preliminary results when protracted analysis is unavoidable.
- **Sociable Troglodyte:** Don't allow the data analyst to become a recluse—clarify the data analyst's role and contribution as an active, engaged team member; broaden this individual's perspective on the scope of the analysis process.

The Reluctant Risk Takers

Fear of failure can be a compelling force for doing nothing or doing a lot of something that amounts to nothing. Both are paralytic and non-productive in their own way. More often than not, the "something" in the "something that amounts to nothing" is overwrought analysis. And it is instigated at the behest of the decision maker who either commissions it or condones it under the guise of not wanting to short-circuit the analysis process.

In recent years, much has been said and written about risk aversion—the problems it can cause, how to measure it, and the psychological makeup of the individuals who suffer from it. But regardless of circumstances and individual differences, there is a common impulse that often compels those who are risk-averse to seek more from analysis than analysis is able to give—namely, the elimination of uncertainty. While analysis may yield information that's helpful in accommodating uncertainty, it can't eliminate it. Such is the fate of any endeavor that involves future events. Nevertheless, when the stakes are high, many decision makers seek solace in extensive analysis in the hope that it will eliminate the uncertainty associated with their actions and decisions. This is the basis for the descriptive label Risk Uncertainty Paralysis that is applied to the second analysis paralysis condition.

The distinction between uncertainty and the probability that a particular risk event will occur is a subtle but important one. The probability that a risk event will occur can often be estimated from historical results, controlled experiments, or an aggregation of expert opinions. It is frequently expressed as a single number, such as an index on a scale of one to 10 or a decimal percentage value from zero to 1.0. By contrast, uncertainty is neither measurable nor quantifiable—a fact that can be distressing to decision makers who seek absolutes or those who use probabilities in calculations to establish risk mitigation priorities. It is the root of the fear that makes some reluctant to take risks that have an extremely low likelihood of occurring but will have serious consequences if they do. In addition to influencing the confidence in risk probability estimates, uncertainty also influences the confidence in risk-



consequence assessments. Even if the decision maker has a clear understanding of the near-term consequences of a particular risk event, the long-term consequences may be confounded by factors that no one can predict. What's more, uncertainty may even enter the picture when the manager is trying to identify the risk factors in the first place. After all, there is always the possibility a critical risk factor will be completely overlooked. Considering the multitude of ways uncertainty can influence the accuracy of risk assessments, it's understandable why the fear of uncertainty can have a paralyzing effect on the project, program, or mission—giving rise to extensive analysis in the hope that the numbers, if tortured long enough, will confess to something that will allay the decision maker's fear of the unknown.

Treating Risk Uncertainty Paralysis is a moot point if it is never acknowledged as a problem in the first place. For obvious reasons, few decision makers will likely admit they are guilty of it. But it could also be the case that they simply don't recognize it for what it is. This might suggest that the onus for identifying and treating the problem will fall on the shoulders of a higher-level decision maker—the Churchill, so to speak, who is concerned with bigger issues. On the other hand, prudent decision makers will often request and consider the advice of their trusted lieutenants, perhaps avoiding the need for any intervention from above.

This brings us to the following suggestions for dealing with Risk Uncertainty Paralysis:

- **Certainty of Uncertainty:** Pay attention to the degree that uncertainty influences the accuracy of estimates of risk probability and risk consequences—especially how it influences your confidence in and willingness (or reluctance) to act on these estimates.
- **Bandwidth of Fog:** Rather than single-point estimates of risk probability and risk consequences, consult with others to come up with feasible range estimates for each of these, then account for the range of possibilities in your risk mitigation scenarios.
- **Brainwidth Expansion:** Seek the opinion of others; ask those you trust for their candid appraisal of what, if any-

thing, can be learned from further analysis to reduce uncertainty.

The Option Seekers

The age-old bromide that says “the more we learn, the less we know” has a role in contributing to the condition that can be identified as Decision Precision Paralysis. As one set of options is explored, questions and possibilities emerge that give rise to additional options that come with their own set of questions and possibilities. And so the cycle continues, if allowed to do so.

Once the Decision Precision Paralysis cycle is under way, it can be hard to break out of it. While it is often justified on the basis of exploring all the options, there is seldom time to fully explore all of the available options. Furthermore, there is no way of knowing if all of the options have been identified in the first place—fueling a quest to reduce uncertainty, thus blurring the line between Decision Precision Paralysis and Risk Uncertainty Paralysis.

On some level, every decision maker knows that choices involve tradeoffs. Still, when the stakes are high, the fear of making a bad choice can stymie the decision to make a decision. Rather than trust their experience and intuition and then act on the best-available information—as they must do at some point—decision makers will often turn to further analysis or exploration in the hope of making precisely the right decision. But gold plating an important decision through continuous refinement can be even more crippling to a project, program, or mission than the more familiar gold plating of which designers and developers are often guilty.

Another factor that can throw the decision process into a loop is a condition called “choice overload”—the feeling of being overwhelmed from having more options to choose from than there is time available for evaluating them all. As Barry Schwartz points out in his book, *The Paradox of Choice: Why More is Less*, we all like the idea of having choices, but beyond some point, having too many choices becomes an impediment to clear thinking. Furthermore, it’s easy to see how decision gold plating can feed choice overload—and vice-versa—creating a kind of negative synergy between the two. It is also true that what often passes for information overload is actually choice overload.

It would seem that experience is the best antidote to Decision Precision Paralysis. After all, experience is arguably the greatest asset a decision maker has to rely on when it comes to difficult choices, especially in time-critical situations. But experience can also be an impediment when the clock is slowed down and there is time to reflect on prior decisions that resulted in untoward consequences. The “experience demon” in our head may also dredge up an incident from the distant past when disaster occurred following a chain of relatively minor decisions. The economist Alfred E. Kahn characterized such a sequence as the “tyranny of small decisions.” It is a condition that can give rise to disproportionate concern for even small decisions.

Drawing on these observations, we can begin to think about solutions for dealing with the Decision Precision Paralysis problem. Here are three possibilities:

- **Fast and Frugal Decisions:** Identify two to four discriminating criteria that will allow you to quickly pare down a list of options rather than attempting to weigh, score, and compare every option—and hone this skill through practice.
- **Think Strategically:** Consider the costs versus the benefits of delaying a critical decision in order to prolong the evaluation of options.

- **Wise Up:** When evaluating options, run the numbers but also trust your intuition—it is the silent voice of experience that adds wisdom to information.

We may never know at what point in his life Churchill came to believe that an obsession with perfection is tantamount to paralysis. Churchill’s fellow countryman, poet T.S. Eliot, might have had something to do with it when he penned the following lines for a 1934 poem titled “The Rock”:

*Where is the wisdom we have lost in knowledge?
Where is the knowledge we have lost in information?*

Perhaps answers to those important but difficult questions will begin to emerge once the analysis paralysis label is stripped of its terminological inexactitude.

The author welcomes comments and questions and may be contacted at lon@r2assoc.com.



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Is 99.999% Operational Availability Practical for Department of Defense Systems?

James Young

Changes are needed to make significant improvements to operational availability and must be considered as early as possible during the design cycle; however, after initial system development, design changes are typically cost-prohibitive. The Department of Defense needs to ensure maintenance and supportability are considered during all phases of the system development cycle, particularly during initial design. That becomes evident when one considers

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that the largest cost of a system's life is consumed during the operating and support phase, and by the time a system reaches the production and deployment phase, at least 70 to 80 percent of the operating and support phase costs of the system are already set (see Figure 1).

Changes after the concept exploration/definition phase are cost-prohibitive and would require a substantial investment in redesign, remanufacturing, and production; as well as installation and fielding of the improved hardware/software, among other tasks. Supportability experts must be involved and be considered principal stakeholders during the early design phase of a system, allowing cost-effective supportability to be designed into the system. Even though some programs state that supportability and affordability are very important in the development of a new system, they are not provided the same importance as technical specifications or per-unit production costs. DoD is missing an opportunity to save significant money by ensuring life cycle costs and associated supportability are fully considered during early stages of system design.

Consider mean logistics delay time and the fact that it has a significant effect on operational availability. This article demonstrates that reducing mean logistics delay time and mean time to recovery—the average time that a device will take to recover from any failure—while increasing the value of the mean time between failures can easily be done.

Commercial Versus Government

Let's consider some initiatives that have worked for the commercial sector and consider applying them to government systems. Commercial satellite systems and commercial computer servers for financial institutions often reveal operational availability values approaching five nines, which indicate 99.999 percent availability. Satellite television and servers are important to a large number of people, as they will notice and be inconvenienced if their service is disrupted. They are also important to business. A loss of service means a loss of dollars. In some cases, millions of dollars per minute are lost in the event of a complete server or satellite failure.

Typical weapons system operational availability values are very good if the system achieves an operational availability of 90 percent. Keep in mind that with a critical weapon system, a loss of service at an inopportune time may cost a great deal more than millions of dollars per minute—we may lose hundreds, if not thousands, of American lives. Personnel loss is capability lost. So when we consider loss of service of a critical weapon system, we must also consider the importance of the system to safety as well as the effects on the defense of the United States.

What makes the commercial sector able to achieve 99.999 percent availability while DoD systems are lucky if they achieve 90 percent? Why can't DoD weapon systems be as reliable as commercial systems? Hot swapping and redundancy are two items reflected in the commercial world that can benefit DoD systems and help them achieve higher availability.

Let's look at a computer server and how it achieves very high availability. One method large financial institutions use is to choose highly reliable assemblies or modules for computer servers. For example, computer hard disk drives typically have a five-year warranty and a stated mean time between failures of approximately 1.2 million hours. If those commercial enterprise computer hard disk drives were like government weapon systems, government employees would need to replace the hard disk drive at least every six months and spend a great deal of time reloading their operating systems and applications software. Imagine the loss of productivity and capability to do our everyday jobs with hard disk drives like that.

Hot Swapping

Another aspect of commercial servers is the ability to hot swap assemblies or modules in the event of a failure. (Hot swap refers to the ability to swap or remove a module or circuit card assembly and replace it with power on. Normally, one must power the system off, remove the faulty module, install a new module, power the system back up, then use the system.) Virtually all high-end servers now have the ability to hot swap, and those servers usually only cost thousands of dollars. Typical weapon systems are in the millions or tens or hundreds of millions of dollars range yet have availability values much lower than the typical high-end server and do not have the ability to hot swap assemblies or modules.

One method commercial enterprise computers use to achieve near-100-percent availability is to write the software so that upon a hardware failure, the computer will de-allocate the faulty assembly from the resource pool and task other assemblies to do the tasks required. Is it possible to do this with the computers/processors, memory, etc., in our critical weapon systems? Yes, it is! Hot-swappable technology has matured significantly over the past several years and is now at the point where cost-effective system designs can readily use the technology. In addition, the costs for hot-swappable modules are very close to non-hot-swappable modules. Hot swapping in computer servers is so common today that costs have dramatically reduced.

We often hear the argument that hot swapping is much, much harder to do with radio frequency devices and circuits and other government technologies. But look at the commercial and government satellite industry. A quick Internet search will reveal thousands of vendors advertising their hot-swappable power supplies, processing boards, memory

boards, storage devices, radio frequency and digital amplifiers, switches, and so on. If industry is doing it, why can't government? Why are we not performing hot swapping in critical weapon systems? We should be using hot-swappable assemblies as much as practically possible in our systems.

Redundancy

Another area of consideration as DoD seeks to achieve 99.999 percent availability is redundancy. Have you noticed how the phone system works fine the vast majority of the time? Have you also noticed that when a catastrophe happens (like the Sept. 11, 2001 terrorist attacks), suddenly you cannot call anywhere? That indicates there is excess capacity built into the phone system for typical usage, but in the event of a disaster, the system cannot handle the volume, and the excess capacity is all used up. If the phone system were more critical, then excess capacity would enable us to call whenever we wanted—even during catastrophic events.

DoD should build in some excess capacity for critical weapon systems during the early design phase so warfighters never experience the inability perform vital tasks. How much excess capacity to build in must be determined based on the criticality of the functions. We need to do some analysis and choose the optimal level of redundancy, highly reliable assemblies, hot-swappable assemblies, excess capacity, etc., in our critical weapon system design. Single-point-of-failure items are good candidates for built-in redundancy.

Redundancy is typically viewed as cost prohibitive, but it should be considered for most critical functions. If we have a system design and conduct some analyses to determine very critical functions, then we can do a cost-versus-capability analysis to determine if the operational importance of the

Figure 1. Life Cycle Cost by Phase

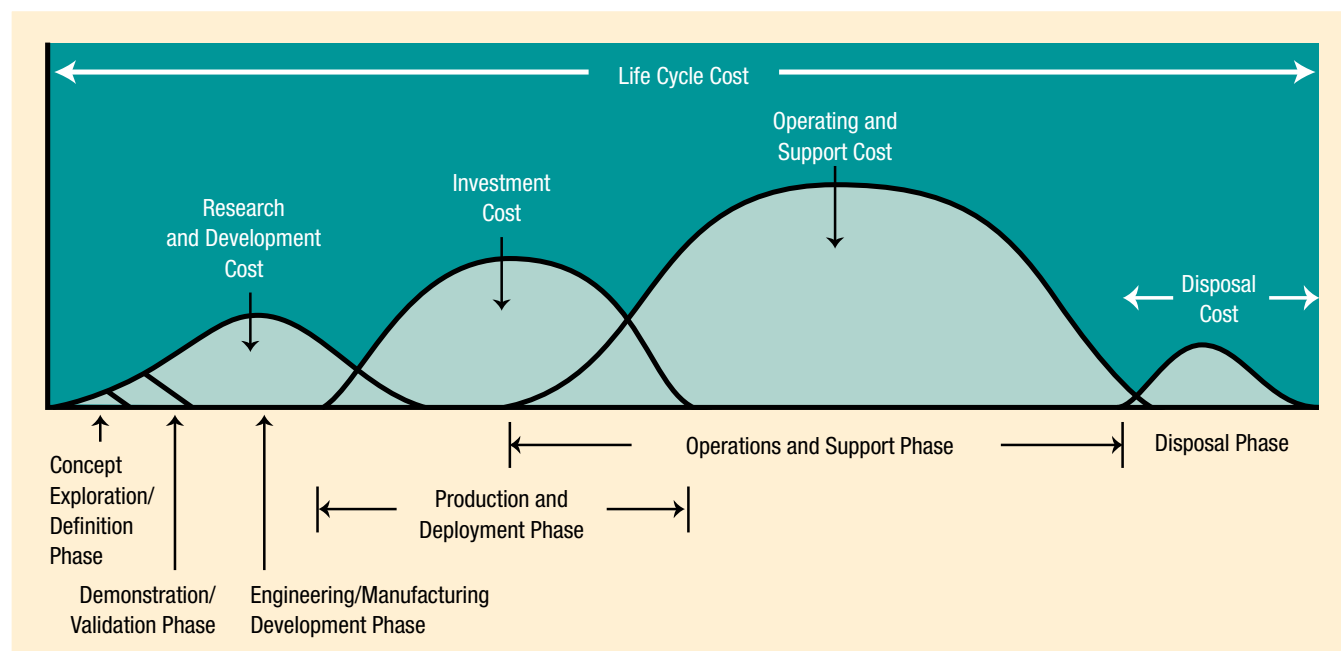
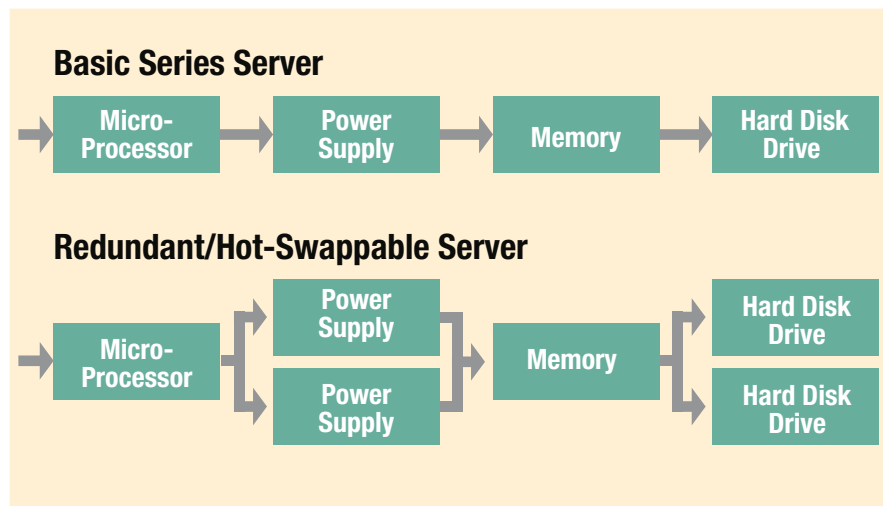


Figure 2. **Basic Server Configuration Versus a Redundant/Hot-Swappable Server**



functions is worth spending more money to have redundancy and/or excess capacity.

Hot Swapping and Redundancy Examples

For the greater operational availability techniques I've discussed to be fully realized, new system hardware and software designs must periodically and automatically check the status of all assemblies in the background without affecting normal operation; electrically remove or disconnect faulty modules from the resource pool; provide seamless operation to the operator; automatically notify maintenance personnel of fault conditions with full descriptors for action required; enable hot swap capability; and reallocate the new assembly to the resource pool.

To illustrate those tasks fully, let's consider a very basic example of a typical server and the effects of redundancy and hot-swappable assemblies on the overall cost and availability of the system and plot this as a representation of cost versus availability over the life cycle of the system. Let's consider a basic cost analysis of each of these systems. Figure 2 compares a basic server with a server with redundancy and hot swapping.

If we were to consider the support cost of the basic and high-end servers, we would discover an increase in costs for the modules to support the redundant and hot-swappable system. A simple example of that is illustrated in Figure 3. You'll notice that the cost of each module that is hot-swappable is higher than the basic server. Also, you'll notice we will be paying for more failures. You might ask, "Is paying approximately 50 percent more in parts costs per year a viable option?" At first glance, it doesn't appear to be wise thing to do; however, with the addition of redundant modules, as well as the ability to hot swap in the event of a failure, the mean time to recovery will be much less than if we had to power the system down.

Other Concepts

Some other concepts DoD should consider during the design phase:

Fault-Tolerant/Switching

Many systems use fault-tolerant designs that switch over to other devices or reroute signals when faults occur, thereby increasing overall availability. If automatic fault switching is included in the early design phase, it becomes a viable option to achieve high levels of availability. Fault-tolerant designs and switching can be leveraged and applied to an entire system rack. In the event of a failure, the operator receives a fault message/indication. The system continues normal operations while maintenance personnel removes and replaces the faulty module. The

repair is accomplished without shutting the software down, powering the server down, or loading/initializing software.

Cost-Based Selection/Optimization

Cost must be one of the major determinants when architecting a system-level design. Operations and support costs play a major role in overall system costs, while development and production are mere fractions of the overall costs of the system life cycle. Designs that leverage cost as an independent variable and influence the design will result in significant savings over the life cycle of the system.

Critical Functions Analysis

A critical function analysis is required to determine if redundancy, fault tolerance, very-high-reliability parts, or ready spares, etc., are needed and are appropriate for the design, or at least for the most critical functions the system performs. In order to determine which components, modules and/or assemblies are critical, an analysis must be performed. If the critical functions analysis reveals

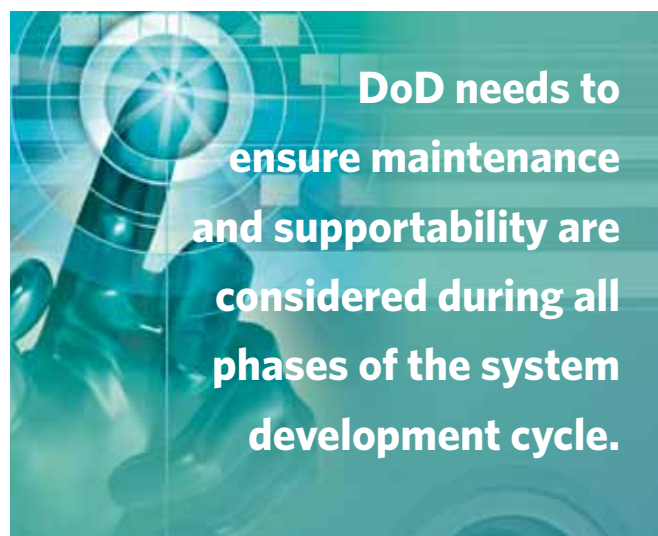


Figure 3. **Basic Cost of Server Hardware**

Basic Series Server						
Module	Quantity	Cost Each	Mean Time Between Failure	#Fails/Year	Cost Sub-Total	Hot Swap
Micro-Proc	1	\$1,500	28,000	0.31	\$469.29	No
Power Supply	1	\$500	12,000	0.73	\$365	No
Memory	1	\$700	50,000	0.18	\$122.64	No
Hard Disk Drive	1	\$300	70,000	0.13	\$37.54	No

Redundant/Parallel Server						
Module	Quantity	Cost Each	Mean Time Between Failure	#Fails/Year	Cost Sub-Total	Hot Swap
Micro-Proc	1	\$1,500	28,000	0.31	\$469.29	No
Power Supply	2	\$600	12,000	1.46	\$876	Yes
Memory	1	\$700	50,000	0.18	\$122.64	No
Hard Disk Drive	2	\$360	70,000	0.25	\$90.10	Yes

single-point failures in the design, those failures should be dealt with by selecting highly reliable parts and applying redundancy, fault-tolerant design via switching to other devices, etc.

Ready Spares

The methodologies I've discussed will keep a system running in the event of failure, but eventually, a replacement part will be needed. Currently, in many cases, two weeks is a reasonable time to wait for a replacement part; however, that is not an acceptable length of time if we're to aim for greater operational availability. The spare must be readily available and easily installed for us to realize the maximum benefits of the methods I've discussed. An inventory of ready spares of the most critical assemblies should be stocked in equipment spaces in order to enable rapid removal and replacement upon failure.

If we apply the concepts previously described, particularly redundancy, or have excess capacity for critical functions, then the system can provide near-perfect operational capability even upon failure of critical modules or assemblies—giving us time to replace the part with a spare. For example, if a system has an optimal response time of 10 microseconds and, in a degraded mode, the response time is 15 microseconds, then a slightly degraded response time can easily be tolerated for the relatively small amount of time it will take to hot swap the faulty assembly with a ready spare. Ready spares of critical assemblies must be on hand for trained technicians to quickly and efficiently hot swap the faulty assembly and go from degraded operation to full capability within minutes.

Weighing Costs

We must weigh costs versus operational availability. A constant argument with system design is how much operational availability can we afford? I think we should apply more resources and money during system design to the methodologies I've mentioned. If we do that, we can make cost-effective improvements to the system and improve operational availability; and in the event of a failure, the system can still operate in a satisfactory manner. The excess capacity and/or redundancy will enable the system-level performance to stay practically constant, and the operator may not even notice a change in performance. But we must conduct analyses to determine what the effects on performance would be versus how much we are willing to spend for more operational capability. In most cases, paying a little additional procurement and support cost is justified if significant improvements in operational availability are achieved.

By studying the initiatives mentioned in this article, we can obtain near-perfect availability for DoD systems at very reasonable costs. We should all strive to provide our service personnel with systems that are as reliable as practically possible, are relatively easy to repair, and have near perfect operational availability. The technology to accomplish this is available now and is affordable. What are we waiting for?

The author welcomes comments and questions and can be contacted at james.m.young@navy.mil.



A New Way to Start Acquisition Programs

DoD Instruction 5000.02
and the Weapon Systems
Acquisition Reform Act of 2009

William R. Fast

In their March 30, 2009, assessment of major defense acquisition programs, the Government Accountability Office (GAO) made this statement regarding cost growth:

While there are different ways to measure the extent and nature of cost growth, there is agreement between DOD and us on the sources of the problem: (1) programs are started with poor foundations and inadequate knowledge for developing realistic cost estimates; (2) programs move forward with artificially low cost estimates, optimistic schedules and assumptions, immature technologies and designs, and fluid requirements; (3) changing or excessive requirements cause cost growth; and (4) an imbalance between wants and needs contributes to budget and program instability.

Fast facilitates financial and program management training at the Defense Acquisition University. From 2001-2004, he managed programming and budgeting for the assistant secretary of the Army for acquisition, logistics, and technology.

To remedy these problems, the under secretary of defense for acquisition, technology and logistics issued a new Defense Acquisition Management System instruction (DoD Instruction 5000.02, Dec. 8, 2008) and the president signed into law the Weapon Systems Acquisition Reform Act of 2009 (WSARA, May 22, 2009). Both actions seek to ensure that acquisition programs start with realistic cost estimates and schedules—based upon mature technologies and designs—in fulfillment of a defined and stable set of performance requirements.

The purpose of this article is to explain the major tenets of these new statutory and regulatory changes and to propose new paradigms through which the program manager should think about cost, schedule, and performance when starting a new acquisition program (see the table on the next page). The table, Paradigm Shifts Based Upon DoDI 5000.02 and WSARA of 2009, depicts the new reviews, assessments, and requirements of the acquisition management system, and is a good reference as you read this article.

The WSARA of 2009 reinforces much of what was published in the new DoDI 5000.02, namely because the Office of the Secretary of Defense worked closely with congressional staff members to craft the language in the act to ensure support to reforms already under way. However, as will be seen, the WSARA of 2009 goes further in elevating the importance of certain aspects of DoDI 5000.02 reforms.

Cost and Schedule Considered in Performance Requirements

The WSARA of 2009 requires that Department of Defense officials responsible for cost estimates, budgeting, and acquisition all weigh in on system capability documents before they are validated by the Joint Requirements Oversight Council. Thus, the DoD director of cost assessment and program evaluation; the under secretary of defense (comptroller); and the under secretary of defense for acquisition, technology and logistics are to comment on tradeoffs between cost, schedule, and performance objectives as part of the requirements development process. This is the first major paradigm shift in how requirements for major defense acquisition programs are validated.

DoD Instruction 5000.02 reemphasizes that “evolutionary acquisition is the preferred DoD strategy for rapid acquisition of mature technology for the user.” In the new instruction, there is just one approach to evolutionary acquisition: incremental development. “Spiral development” is no longer used as an evolutionary acquisition strategy term; however, spiral development can still be used as an engineering term to describe a software development method. “An evolutionary approach delivers capability in increments, recognizing, up front, the need for future capability improvements. The objective is to balance needs

and available capability with resources, and to put capability into the hands of the user quickly.”

To reduce requirements creep, DoDI 5000.02 requires that “the Acquisition Executive of each DoD Component shall establish and chair a Configuration Steering Board (CSB) ... to review all requirements changes and any significant technical configuration changes for ACAT I and IA programs in development that have the potential to result in cost and schedule impacts to the program.” Boards are empowered to reject any changes and are expected to only approve those where the change is deemed critical, funds are identified, and schedule impacts are truly mitigated.

More Realistic Cost Estimates

In the past, the first cost estimate for an acquisition program was developed at program initiation, typically Milestone B. This has changed under the new DoDI 5000.02 and the WSARA of 2009. Now, “At Milestone A, the DoD Component shall submit a cost estimate for the proposed solution(s) identified by the AoA [*analysis of alternatives*].” The emphasis on early costing of the program is to support a Milestone A certification required by Congress (10 USC Section 2366a). In addition, the director of cost assessment and program evaluation shall conduct independent cost estimates and cost analyses for major defense acquisition programs and major automated information system programs in advance of section 2366a or 2366b certifications.

The WSARA of 2009 also requires the disclosure of the confidence levels for baseline estimates for major defense acquisition programs. Justification must be provided if the cost estimate is calculated at a confidence level that is less than 80 percent. By definition, a program estimated at the 80 percent confidence level has an 80 percent probability of coming in at that amount (or less) and a corresponding 20 percent probability of a cost overrun. However, if that same program is estimated at the 50 percent confidence level, it has only a 50 percent probability of coming in at that amount (or less) and may experience cost growth over time. That represents another paradigm shift in the way the military departments and defense agencies estimate the cost of programs, as setting confidence levels to 80 percent and budgeting to those amounts will drive up acquisition budgets, making cost overruns less likely but also making development programs less affordable.

Materiel Development Decision Review

An initial materiel development decision (MDD) review has replaced the concept decision. In the past, acquisition programs could enter the acquisition process at any milestone, provided they met the phase-specific entrance criteria. Now, an MDD review is required first for all potential acquisition programs. It is at that mandatory acquisition process entry point that the milestone decision authority ensures that the program is based on approved requirements and a rigorous assessment of alternatives. Then, according to DoDI

Paradigm Shifts Based Upon DoDI 5000.02 and WSARA of 2009

New Paradigm	Old Paradigm
Cost and schedule must be considered before performance objectives are established.	Performance objectives often established before cost and schedule were considered.
Costs estimated at 80% confidence level (for MDAPs).	With the exception of high-risk cost elements, most costs estimated at 50% confidence level.
Competitive prototyping before Milestone B.	Little prototyping because of cost.
Post-preliminary design review and critical design review assessments for the milestone decision authority make for more robust systems engineering.	Preliminary design review and critical design review were recommended as "best practice" technical reviews.
Independent technological maturity and integration risk assessment by director, defense research and engineering.	Program manager assessed technology readiness level in accordance with <i>Defense Acquisition Guidebook</i> .
Ensure competition at both prime and subcontract levels.	Competition at prime level; prime responsible for subcontract competition.

5000.02, "The MDA may authorize entry into the acquisition management system at any point consistent with phase-specific entrance criteria and statutory requirements."

Material Solution Analysis Phase

The materiel solution analysis (MSA) phase has replaced the concept refinement phase. While an MDA decision to enter the new materiel solution phase doesn't mean that a new acquisition program has been initiated, the new term implies that some type of material solution is being pursued.

The AoA is the key activity of the MSA phase. DoDI 5000.02 calls for a more robust AoA than in the past. "The purpose of the AoA is to assess the potential materiel solutions, identify key technology elements, and estimate life cycle costs, in order to satisfy the capability needs documented in the approved initial capabilities document (ICD)." The AoA must also assess appropriate system training and alternative ways to improve energy efficiency. Additionally, resource estimates must use the fully burdened cost of delivered energy in trade off analyses. As mandated by the WSARA of 2009, the DoD director of cost assessment and program evaluation develops the AoA study guidance for major defense acquisition programs.

Technology Development Phase

The name of the technology development (TD) phase was not changed. However, both the WSARA of 2009 and DoDI 5000.02 require competitive prototyping in that phase.

In a significant paradigm shift for major defense acquisition programs, acquisition strategies must now provide for

competitive prototyping of systems or critical subsystems before Milestone B approval, unless waived by the MDA. Yet even if the MDA waives the requirement for competitive prototyping, a single prototype must still be produced. In addition, the Government Accountability Office will review all waivers and submit their assessment of compliance with this statute to the Congress.

Programs that have historically used prototyping in their acquisition strategies have seen improved performance and increased technological and design maturity. The effort to produce a prototype also helps in understanding development and production costs and aids in the refinement of the program cost estimate. However, even a single prototype, not to mention multiple prototype contracts, can drive up development costs.

During the TD phase, statute and regulation also require that major defense acquisition programs conduct a system-level preliminary design review (PDR). Per DoDI

5000.02, "A successful PDR will inform requirements trades; will improve cost estimation; and identifies remaining design, integration, and manufacturing risks."

The cost-performance trades that result from knowledge gained during competitive prototyping can help keep the program affordable and within the Milestone A component cost estimate. A post-PDR assessment by the MDA is also required, and its purpose is to establish the allocated baseline for the system and to approve requirements trades.

The TD phase is guided by the ICD, draft capabilities development document (not stated in DoDI 5000.02, but implied), and the technology development strategy; and is supported by systems engineering planning. "The project shall exit the TD Phase when a affordable program or increment of militarily useful capability has been identified; the technology and manufacturing processes for that program or increment have been assessed and demonstrated in a relevant environment; manufacturing risks have been identified; a system or increment can be developed for production in a short timeframe (normally less than 5 years for weapon systems); or, when the MDA decides to terminate the effort," according to DoDI 5000.02.

The WSARA of 2009 also requires an independent assessment by the director of defense research and engineering of the technological maturity and integration risk of the critical technologies of major defense acquisition programs. In addition, the director of defense research and engineering is to develop knowledge-based standards

against which to measure the technological maturity and integration risk of critical technologies at key stages in the acquisition process. In the past, the program manager was responsible for technology readiness assessments that were based upon definitions provided in the *Defense Acquisition Guidebook*. While the director of defense research and engineering has yet to announce its technological maturity and integration risk standards, one can expect them to be different from the *Defense Acquisition Guidebook* definitions, perhaps requiring knowledge-based evidence from testing in order to meet the standards.

Engineering and Manufacturing Development Phase

The engineering and manufacturing development (EMD) phase has replaced the old systems development and demonstration phase. The new name for the phase implies that the system (e.g., prototype) works and is ready to be engineered into a producible design. It is in this phase that tools and techniques are to be developed and demonstrated for the manufacturing of the system. A key objective of the EMD phase is to establish the product baseline for all configuration items, resulting in more emphasis on systems engineering and technical reviews.

The EMD phase is guided by the capabilities development document, acquisition strategy, systems engineering plan, and test and evaluation master plan. The acquisition strategy is prepared by the program manager and approved by the MDA.

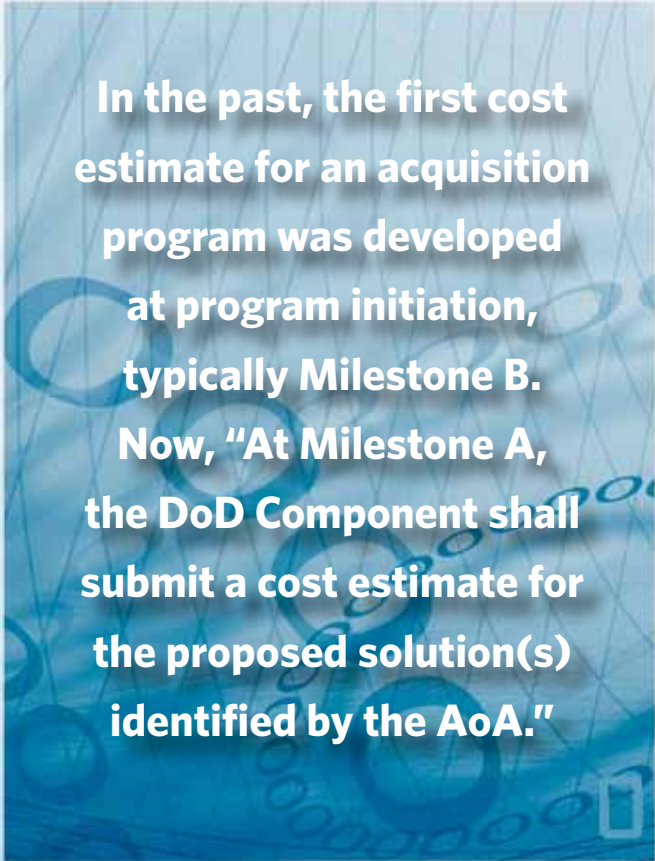
The EMD phase consists of two efforts, the first of which is the integrated system design (ISD) that is intended to define system and system-of-systems functionality and interfaces, complete hardware and software detailed design, and reduce system-level risk. ISD includes establishment of the product baseline for all configuration items. Completion of that effort is evidenced during a system-level critical design review (CDR), conducted by the government program manager and the contractor. Following the CDR, a mandatory post-CDR assessment has replaced the old design readiness review. Its purpose is to tie the product baseline to a decision by

the MDA to continue into the second effort of the EMD phase. Elevating the post-CDR to the MDA level is expected to strengthen the systems engineering effort.

Systems capability and manufacturing process demonstration, the second effort in the EMD phase, is intended to demonstrate the ability of the system to operate in a useful way consistent with the approved key performance parameters, and that system production can be supported by demonstrated manufacturing processes. "This effort shall end when the system meets approved requirements

and is demonstrated in its intended environment using the selected production-representative article; manufacturing processes have been effectively demonstrated; industrial capabilities are reasonably available; and the system meets or exceeds exit criteria and Milestone C entrance requirements," according to DoDI 5000.02.

As was the practice under the old version, the new DoDI 5000.02 requires that programs entering the EMD phase be fully funded in the future years defense program. That means before entering the EMD phase at Milestone B, all of the dollars and manpower needed to carry out the acquisition strategy have to be included in the budget and out-year program. Obviously, a program that is only partially funded is more likely to fail.



In the past, the first cost estimate for an acquisition program was developed at program initiation, typically Milestone B. Now, "At Milestone A, the DoD Component shall submit a cost estimate for the proposed solution(s) identified by the AoA."

The WSARA of 2009 requires that the secretary of defense ensure competition or the option of competition—at both prime contract level and the subcontract level—throughout the life cycle of the program, as a means to improve contractor performance. While ensuring competition at the prime contract level is not new, guidance on government involvement in subcontracting competition has been strengthened. The law requires that the government ensure fair and objective "make-buy" decisions by prime contractors on major defense acquisition programs. Government surveillance of contractor sourcing decisions and the assessment of sourcing fairness and objectivity in past performance evaluations are also mandated.

Under the new DoDI 5000.02, test activities are integrated into every acquisition development phase for early



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The cost-performance trades that result from knowledge gained during competitive prototyping can help keep the program affordable.

identification and correction of technical and operational deficiencies. The new instruction also requires that the deputy under secretary of defense for acquisition and technology conduct an independent assessment of operational test readiness for all ACAT ID and special interest programs.

For programs on the Office of the Secretary of Defense Test and Evaluation Oversight List, the director of operational test and evaluation, in coordination with the program manager, determines the number of production-representative or production articles for live fire test and evaluation and initial operational test and evaluation. There can be significant costs and schedule impacts associated with those test articles and tests.

tative or production articles for live fire test and evaluation and initial operational test and evaluation. There can be significant costs and schedule impacts associated with those test articles and tests.

A Better Acquisition Program

The new DoDI 5000.02 and the WSARA of 2009 mandate changes to the acquisition management system to fix mismatches between requirements, cost estimates, and budgets. The new MDD review—required for all programs—added emphasis on the AoA, and a component cost estimate at Milestone A should help to harmonize actions in the requirements budgeting and acquisition management systems. Knowledge gained from mandated competitive prototyping should also help detect immature technologies and inject more realism into early cost estimates. If implemented, cost-saving trades identified during prototyping can help keep program costs within initial cost estimates. Likewise, configuration steering boards can help put a stop to changing or excessive requirements growth and help contain cost. Finally, full funding upfront for required test articles, statutory tests and evaluations, and formal technical reviews will give new development programs a better chance at succeeding.

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Opportunity Management

Implementing a Positive Complement to Risk Management

Will Broadus ■ Mike Kotzian ■ Phil Littrell ■ Duane Mallicoat
■ Capt. Rick Muldoon, USN ■ Jackie Triplett

These are stressful times for all Department of Defense acquisition programs. Over the past 12 months, the U.S. Government Accountability Office has issued several studies that have criticized how DoD acquisition programs have continued a trend of increased program costs accompanied by lengthening schedules—and in many cases, at the sacrifice of technical capability. In April 2009, Secretary of Defense Robert Gates announced some major changes to the fiscal year 2010 defense budget, stating DoD needed to reform how and what we buy by overhauling of our approaches to procurement, acquisition, and contracting. This was quickly followed by a June 2009 *Washington Times* editorial from Deputy Secretary of Defense William Lynn III who stated that the time is now for “a fundamental overhaul to the way the Pentagon does business,” which can be done by “aggressively pursuing major reforms of how we develop, test, and field the weapons our troops need.” In July 2009, the

Business Executives for National Security Task Force issued a report that identified end-to-end problems with the acquisition system, including “requirements creep, funding instability, poor cost estimating, immature technology, and the lack of flexibility to solve problems.” There’s definitely a trend afoot.

Within this environment, one of the tools program managers have increasingly relied upon to achieve an acquisition program’s cost, schedule, and performance objectives is risk management. Virtually every defense acquisition program is now expected to implement some sort of risk management process across every stage of the program’s acquisition life cycle by ensuring communication to and participation from all stakeholders. Yet, program managers typically ignore a potentially invaluable asset in their program management toolbox that positively complements the risk management process: opportunity management (OM).

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Going Beyond Risk

For those keeping track, this is the third in a series of four *Defense AT&L* articles on the topic of OM. The first article, "Should Opportunity Management be Added to my Programs Acquisition Strategy?" (*Defense AT&L*, May-June 2007), compared OM basics to the more familiar concept of risk management. DoD acquisition programs that have a risk management plan will typically focus solely on the negative aspects or threats needing program attention that are summarized by using a graphic cube to plot each negative in terms of likelihoods and consequences. The OM approach relies upon a similar methodology, but in contrast to the risk management approach, plots likelihoods and benefits. Since OM is focused on taking advantage of positive opportunities that will potentially benefit a program, the larger the potential benefit equates to a larger potential payoff. When considering approaches to handling opportunities, the program has the following strategies to choose from: exploit it, share it, enhance it, or accept it.

The second article, "Opportunity Management: Deciding to Make it Part of Your Program's Acquisition Strategy" (*Defense AT&L*, July-August 2007), defined a notional framework for an OM program composed of seven major steps: empower your integrated product teams (IPTs) to implement OM, identify opportunity candidates, assess the opportunity candidate for advantages and disadvantages, establish the implementation plan, validate all assessments and plans, maintain control/oversight, and communicate and document. When properly applied, this framework provides a solid foundation for an effective OM program.

So what does it take to implement an OM capability? That is exactly what we'll explore as part of this article by describing the path followed by the CH-53 Heavy Lift Helicopters Program Office (PMA 261) in establishing their OM program.

It Starts With Leadership

As part of the U.S. Navy's Program Executive Office for Air Anti-Submarine Warfare, Assault and Special Mission Programs (PEO[A]), PMA 261 is composed of two major helicopter programs: in-service aircraft (CH-53D, CH-53E, and MH-53E) sustainment, support, and capability improvement projects; and the CH-53K Heavy Lift Helicopter development program. The Marine Corps' CH-53E heavy lift helicopter is relied on to move troops, vehicles, and supplies. However, with a deployed operations tempo three times the planned utilization rate, the CH-53E legacy systems are incurring increased airframe and component repair costs. That is increasing the pressure to field the CH-53K with its increased range, payload, survivability, reliability, maintainability, and improved total ownership cost as soon as practical.

In addition, like many program offices, PMA 261 is facing tight cost and schedule constraints interrelated with technical challenges, and the organization is also reliant upon a geographically dispersed workforce separated by hundreds

of miles. The PMA 261 program manager and co-author of this article, Navy Capt. Rick Muldoon, conducted an organizational climate survey when he first took command in 2007 to determine the organization's health, and again in 2009 to determine where progress had been made and what areas still needed attention.

As a way to help address the program's interrelated cost, schedule, and technical challenges, PMA 261 senior leadership sought to institute an OM program to positively leverage any possible program advantage in order to extend the productive life of the legacy CH-53s while simultaneously working to quickly develop and deploy the desperately needed CH-53K capability to the warfighter.

Developing an OM Mindset

As with most programs, PMA 261 initially focused on the risk management process. Starting in June 2006 soon after the start of the CH-53K development contract, PMA 261's Joint Risk Management Board (JRMB) re-evaluated, strengthened, and documented the organization's risk management approach through a formal risk charter and risk management operating procedures created specifically for the new CH-53K program. The revised approach empowered risk management at the lower-tier IPTs, who then elevated assessments to the JRMB for consideration. That was viewed by PMA 261's senior leadership as a key development to ensure the entire organization institutionalized risk management as part of each IPT's standard work. What had been a top-down risk management approach became a combination of top-down and bottom-up approach.

The process of developing and coordinating the risk management operating procedures did raise discussions about the potential of including an OM program as a formal mechanism within PMA 261. Efforts within the organization were made to formally initiate an OM program, but support was sporadic. Unfortunately, the existing risk management tool—Risk Management Information System, or RMIS—did not feature an OM tracking capability. That shortfall hindered the continued use and inclusion of an OM program within PMA 261. Initial attempts to include OM depended on individuals manually producing Microsoft® Excel spreadsheets and status briefing charts, which proved to be resource intensive and inefficient. Maintaining that status quo was most likely going to result in the demise of an OM program initiative simply because the affected workforce did not have a feeling of importance associated with OM or the necessary tools to implement such a program.

Developing Processes

But momentum began to build in December 2006 when PMA 261 drafted their opportunity management principles guideline. This first OM-specific document served as a guide to those involved in documenting and implementing opportunities as well as those who were actively involved in the management of opportunities on a day-to-day basis.

The contents started at a big picture overview of OM and drilled down to cover how OM was going to be specifically structured within PMA 261, including management process, roles, oversight, process flow, and metrics. In short, PMA 261 developed an OM implementation plan to guide their workforce as a way of standardizing an OM program throughout the organization.

Even with this document in place, it wasn't until the summer of 2007 that PMA 261 tracked a specific program opportunity in accordance with their opportunity management principles guidance. What became evident was that process improvements were needed to make the OM program a more viable tool for the PMA 261 workforce. One of the biggest lessons learned was that the risk working group—an IPT-level group chartered to oversee risk and opportunity management initiatives—needed to better define the process objectives and monetary resources that could be used to implement decisions. Also, OM-related instructions and training provided to the PMA 261 workforce needed improvement to decrease confusion. In hindsight, Muldoon noted that “while everyone was encouraged that OM was getting some focused attention, it was apparent that we were not yet ready to fully implement an OM process until roles and responsibilities were clearly identified.”

At the same time PMA 261 was going through their OM program growing pains, PEO(A) issued a policy memorandum that set out to institutionalize a best practices framework across the PEO(A) enterprise. Risk, issue, and opportunity management were all identified within this policy memorandum as “key management tools necessary for the development of credible cost, schedule, and performance objectives.” Clearly, OM was gaining increased visibility.

Over the next six months, slow but steady progress was realized. A more clearly defined threshold cost criteria was published in the spring of 2008 that greatly aided the PMA 261 IPTs in the identification and initial analysis of candidate opportunities. But the real breakthrough occurred in May 2008 when an improved automated tool was introduced to support PMA 261's OM process.

Tracking Risk and OM

The Risk and Opportunity Management Application (ROMA)[™] software tool uses a best practices approach of paralleling risk, issue, and opportunity management by compiling information for all three areas into one central management location. Having this compilation capability through an automated means greatly simplified the process and provided tailored reporting so that program managers and subject matter experts could focus on high-interest areas. Subject matter experts now had easier and timelier access across the OM program life cycle and, most important, an increased willingness to use an OM-related tool. The increased use resulted in benefits across the PMA 261 enterprise that would not have been possible without ROMA's

automated capability. In addition, ROMA ensured a swifter transformation of OM information into tailored decision making documents and briefings that allowed PMA 261 senior leadership to make better informed strategic decisions. Figure 1 illustrates an example of the ROMA user interface.



Figure 1. ROMA User Interface

Jackie Triplett, risk management project manager for L-3 Communications supporting PMA 261 and a co-author of this article, said, “Introducing ROMA was probably the major reason that lower-tier IPTs finally embraced OM as part of an every day program management approach. It was a vivid illustration that any workforce needs the proper tools before the enterprise is able to gain the potential benefits—especially a new management capability that experienced some initial workforce uncertainty.”

Establishing an OM Process

In addition to searching for an active OM program to be fully accepted within PMA 261, a clear and concise OM process needed to be developed. The document that captured and communicated PMA 261's OM process was the opportunity management principles guidelines, which institutionalized OM procedures within PMA 261. Developed with input from all IPTs, this document was a key enabler of OM acceptance across the PMA 261 enterprise.

As a first order of business, a common nomenclature was sought to ensure that as the opportunity moved through the opportunity life cycle, all IPTs were able to discuss the status without any confusion. PMA 261's opportunity management principles guidelines ended up defining five levels of an opportunity's status:

- **Candidate:** not yet reviewed, and/or more information is needed and/or is being gathered before recommending the opportunity to the high-level Program Opportunity Management Board (POMB), which is the group responsible for overall functional oversight. When appropriate, the POMB function can be delegated down to the JRMB for increased efficiency and timeliness.

- **Rejected:** opportunity has been reviewed and is not envisioned to ever be accepted for implementation. The opportunity would typically not be expected to return for additional review.
- **Deferred:** the opportunity was initially rejected but was expected to return for additional review at a later specified date.
- **Open:** the POMB opened the opportunity for immediate implementation according to an approved plan (open/executing). Alternatively, the POMB could have opened the opportunity for additional information gathering with an expected return to the POMB for a go-ahead decision (open/estimating).
- **Closed:** the opportunity's objective has been reached or is now considered overcome by events.

As illustrated in the opportunity life cycle flow diagram (Figure 2), an opportunity is defined by an opportunity originator, who could be any member of the PMA 261 enterprise. The opportunity originator provides a preliminary description and assessment while entering the opportunity into the automated ROMA tracking tool. The opportunity originator then socializes the opportunity with the appropriate IPT lead and subject matter experts for consensus.

If the IPT lead is convinced that the potential opportunity offers some level of benefit to the program, the IPT lead takes control by discussing the opportunity among all IPT leads. An opportunity coordinator facilitates the opportunity review process and ensures timely reviews.

The opportunity is next passed to the Opportunity Working Group to ensure the benefits, likelihood of success, risk, and costs involved with implementing the opportunity are adequately captured and are sufficient to warrant review by the POMB. If the OWG deems the opportunity unworthy, the opportunity is closed or considered a candidate requiring additional analysis.

The OWG will recommend opportunities that are sufficiently scoped to the monthly POMB, which has three options: approve the opportunity, assign ownership, and provide funding to build an achievement plan; request further investigation and provide

funding to accomplish such an action; or defer the opportunity pending a later review. All relevant IPTs are involved throughout this decision-making process.

Upon POMB concurrence, the opportunity owner and appropriate team members are now charged to build the achievement plan for the approved opportunity. This plan will identify the set of steps and timelines necessary to increase the likelihood of achieving the opportunity's benefit. The opportunity owner presents the achievement plan and associated budget to the POMB for review and approval.

Upon POMB approval, an opportunity owner, working with appropriate team members, is responsible for implementing the opportunity in accordance with the approved achievement plan. As scheduled by the opportunity coordinator and under OWG guidance, the opportunity owner periodically presents the opportunity's implementation status to the

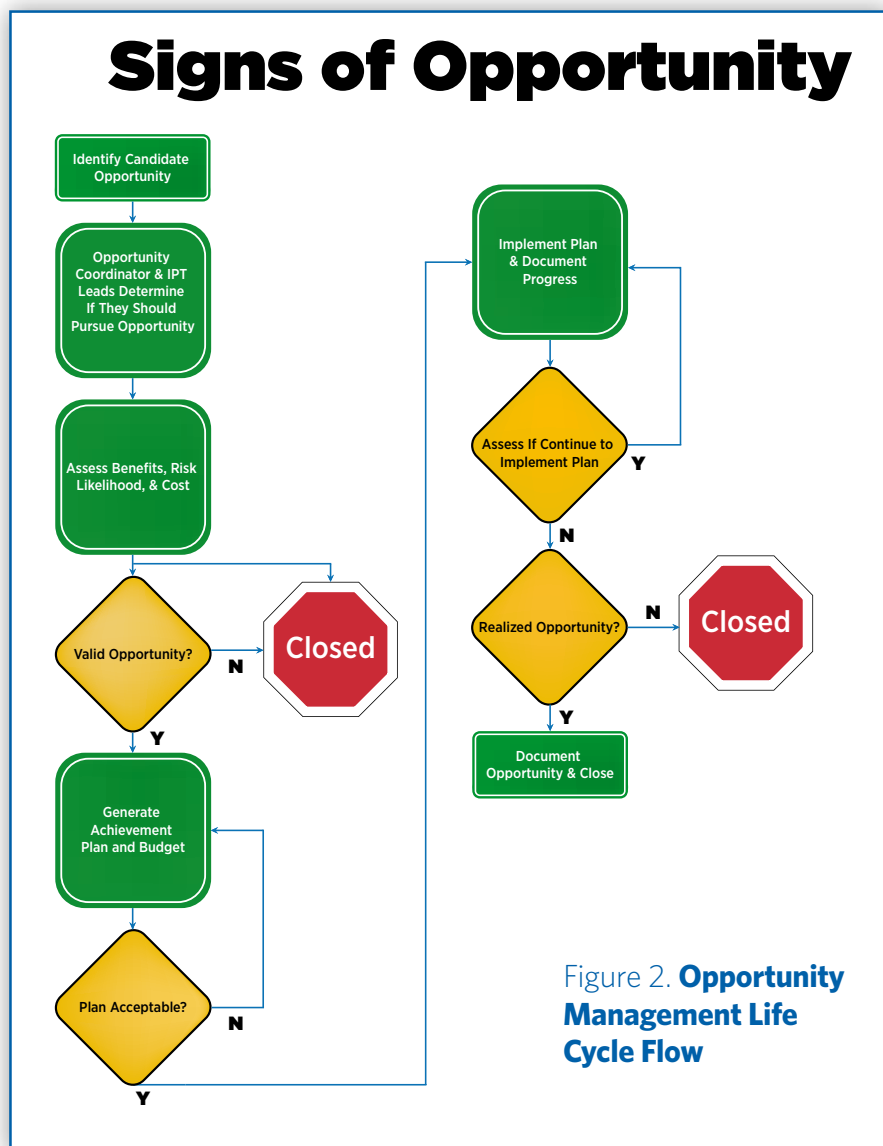


Figure 2. **Opportunity Management Life Cycle Flow**

Opportunity Item No.: 53KOPP-xx-xxx
 Title: Opportunity Title
 Initiator: Your Name

Owner IPT: IPT Name
 IPT Lead: Lead of Owner IPT
 Nearest Impact: PDR, CDR, other event

Description: Concise sentence providing accurate description of the opportunity.

Source: Concise sentence or two on the source of the opportunity (concept source – is it like something else prior or is it different?).

Benefits: Concise sentence or two providing a description of the benefits if the opportunity is realized.

Detriments: Concise description of possible disadvantages/liabilities associated with the opportunity.

Risk (if any): List any risks associated with implementing the opportunity.

Likelihood/Rationale: Brief description of reasoning for the current Likelihood and Benefits rating.

Step	Planned Start Date	Planned End Date	Description	Success Criteria	L	C	Comments
1			Steps in plan to realize the opportunity				
2							
3							
4							
5							

Please fill out as much estimation information as possible on the following page – it helps in evaluating the opportunity.

Opp. Type: T
 L: 3
 B: T-2
 S-0
 C-0
 Initiated: 21-Jun-06

Nearest Impact: PDR
 Time: S/M/L

(use "tab" to add more rows)

Figure 3. Illustrative ROMA Submission Page

POMB for a decision to continue or end the implementation phase, or even reassign the opportunity implementation. The ROMA software tool acts as the key communication enabler throughout the opportunity's life cycle (Figure 3).

Eventually, the POMB decides if the opportunity implementation is adequately realized, should be further implemented (with possible changes), or should be closed. If the opportunity is fully realized, the final outcome is documented within the ROMA and the opportunity is closed out.

Benefits of OM

Expect your organization to navigate unfamiliar territory if you decide to implement an OM process, as the newness of OM pretty much guarantees a learning curve while attempting to achieve the full benefits afforded by OM. After experiencing the associated growing pains and some journeys down blind alleys, the conclusion of PMA 261's senior leadership is that OM is right for their organization. As PMA 261's program manager responsible for implementing an OM process, Muldoon stated that "the OM process is something every program should seriously consider as a complement to the more familiar risk management process. There are great cost, schedule, and technical performance benefits to be had with a well-established OM process. We view OM as an integral part of program management and

have realized significant benefits through its use on the CH-53K development program."

The case of PMA 261 is just one illustration of an organization implementing an OM process, but it does serve as a terrific starting point for any organization wanting to implement an OM process. Recognizing that most organizations are unique, the PMA 261 OM process is flexible enough so that other organizations can tailor this particular OM process to fit their own situation. As long as the organization's leadership understand that the implementation of any OM process requires upfront commitment and continued follow-through, there are positive program outcomes to be shared with key stakeholders.

So, is an OM process worth the effort it takes to get it off the ground? The possible benefits of improved cost, schedule and/or technical performance may be the best incentive that could be offered in the competitive world of DoD acquisition.

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Integrated Master Plan Analysis

The PMAG Approach

Col. Mun H. Kwon, USAF

It has been widely recognized that there is room for improvement in the Department of Defense's program management, program control, and acquisition design review processes. DoD can improve the success of its acquisition workforce by providing acquisition professionals with a better framework from which to work, by instilling passion and understanding in them from an early point in their careers, and by putting the focus on content-based program management execution. The Program Management Assistance Group (PMAG), located within the Space and Missile Systems Center, Los Angeles Air Force Base, Calif., helps promote

Kwon is the director of the Program Management Assistance Group at Los Angeles Air Force Base, Calif.

the success of programs by instilling improved methodologies and mindsets into new program/project managers.

Refining Competency in Communities

The improvement process starts by providing acquisition professionals and support contractors with a full understanding of not only what they are doing, but why they are doing it. They need to understand their programs with a holistic view, seeing not only the engineering aspect of how Tab A fits into Slot B, but also how the functions of program management interrelate and how content-based execution enables the acquisition professional to make better integrated technical, cost, schedule, and management control decisions.

On-the-job training is crucial to developing expertise in content-based and holistic program management. Classroom lectures teach processes; but actually performing the tasks, working with others, and seeing how a program fits together develop true integrated program management expertise. Hands-on training helps the program manager understand the framework. It also develops skills and knowledge that will be programmatically crucial and professionally rewarding throughout the program manager's career. A program manager can then better understand what programmatic activities he or she is managing at any given moment, why those activities are important, what events made the activities necessary, and why the activities will be necessary for the future state of the program—all contributing to an understanding of the importance of developing a thorough knowledge of the life cycle acquisition program assurance framework, including the integrated master plan (IMP), which is the blueprint of the program.

Criticality of the IMP

An IMP is crucial to successful execution of any program. An IMP should be crafted as early as possible in a program's life to ensure an understanding of the program's events, significant accomplishments, accomplishment criteria, and associated tasks. Such a top-down perspective should not be detailed to the control-account level, but it should provide an excellent opportunity for greater knowledge and understanding of the program by all personnel involved. It also provides the perfect vehicle for clear understanding of a program's scope before the IMP's framework is expanded into an integrated master schedule to reflect appropriate, manageable, and executable tasks. Underscoring the benefit of such planning, the Defense Acquisition Guidebook states: "When documented in a formal plan and used to manage the program, this event-driven approach can help ensure that all tasks are integrated properly and that the management process is based on significant events in the acquisition life cycle and not on arbitrary calendar events" (Chapter 4.5.2, <<https://akss.dau.mil/dag/welcome.asp>>).

Integrated product teams can develop an appropriate IMP according to program requirements as they become appar-

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ent. The IPTs' roles become clearer as the program's scope of work comes into focus and the program structure becomes well-defined. Dependencies are defined as program managers become more skilled in the nature of their work, and their place in the program's scope is made clearer. And most important, the process of forming an IMP is one of collaborative team effort, ensuring the flow of knowledge and understanding among IPTs (vertically and horizontally) and individual program participants, mitigating risk at the earliest stages of the program.

The formation of a hierarchical, event-based IMP structure is an essential element of life cycle acquisition program assurance framework. As the *Integrated Master Plan and Integrated Master Schedule Preparation and Use Guide* of 2005 explains, the development of an IMP and integrated master schedule gives "offerors flexibility in performing detailed program execution planning, organization, and scheduling within any existing Request for Proposal (RFP) constraints." An IMP is a cornerstone document that should be in the foundation of any acquisition program. It is an important management tool from the beginning of the life cycle acquisition program assurance framework through source selection, program execution, and up to program selloff activities, including functional configuration audits and physical configuration audits. Though the IMP is detailed to only three levels (program events, significant accomplishments, and accomplishment criteria), it affords crucial help to the remainder of the program's life cycle.

The program's integrated master schedule can be formed easily by loading tasks into the IMP and digging deeper into the task level to determine sub-tasks and work packages. If the first three layers of program detail—program events, significant accomplishments, and accomplishment criteria—are not properly established in the IMP, the fourth layer—task or activity—displayed in the integrated master

schedule will be predictably inadequate and will inevitably result in poor program execution. Proper review points are established, and criteria for their successful completion will have been put into place via a proper IMP. That leads to a viable initial baseline review that will establish and verify an accurate performance measurement baseline, including cost, schedule, and performance aspects of work scope. The integrated baseline will be the pulse of the program, verified at key events by accomplishments and by criteria throughout the program's life cycle.

The Role of the PMAG

As the PMAG has seen in multiple programs, developing an IMP as early as possible in a program's life can significantly reduce and minimize later problems. To briefly sum up the purpose of the PMAG, it is an assistance group, not an oversight or independent readiness review group. PMAG brings management control processes together with integrated technical, schedule, and cost expertise through dynamic, interdisciplinary, and interchangeable teams composed of senior subject matter experts. Its purpose is to supplement the acquisition efforts of program offices in facing their unique challenges. Though chartered to assist space-based acquisitions, the success of its paradigm has been advocated throughout the Air Force, bridging both space and non-space acquisition programs. As such, the PMAG has assisted numerous programs at various stages of development, often staying engaged through years of a program's acquisition life cycle. That has provided the PMAG with an uncommon view into programs' unique cultures and has provided an organic repository of lessons learned and exceptional methodologies, including with the development of IMPs. Although the group is an Air Force-based organization, it provides an example that can be applied across the Department of Defense. (Note: You can read more about PMAG in Kwon's article "The Relentless Pursuit of Program Management and Acquisition Excellence," *Defense AT&L*, July-August 2009.)

The PMAG provides a functional and educational bridge, supporting program offices and providing valuable assistance to improve the performance of current programs and provide opportunities for learning to improve future programs. Support can be provided at any point in the program's life cycle, but notably at the creation of a program's IMP.

PMAG Experiences

Having worked with multiple programs on IMP creation, the PMAG has seen how program team culture, IMP formation methodology, and timeliness of IMP creation can affect creation of the IMP and the entire execution of a program. Although no names or programs are mentioned in the following examples, they are real examples experienced by PMAG staff members.

When Things Go Wrong

One program started its IMP creation early in its life cycle, and the acquisition wing commander collaborated and



Having worked with multiple programs on IMP creation, the PMAG has seen how program team culture, IMP formation methodology, and timeliness of IMP creation can affect creation of the IMP and the entire execution of a program.

worked closely with the contractor. One would think that a viable and logical product would be the end result of such a collaborative effort; however, the contractor was intransigent, arranged IPTs around the room in small groups, and encouraged discussion without focus on action to develop the IMP structure. The contractor's IMP creation plan was to place Post-it® Notes on the walls according to how each IPT saw the program events, significant accomplishments, and accomplishment criteria for the program. The notes would then be compiled into a single consolidated IMP, to be reviewed and edited by the large team. Most groups had very few inputs. Only those groups with strong leadership and focus were able to produce more than a few inputs.

When it came time to compile the data into a single IMP structure, most groups did not have enough inputs from which to form even the bare skeleton of an IMP. The exception was one group that truly achieved the initial goal. Its members had worked hard and developed an IMP for the

assigned scope while the contractor personnel continued to talk. However, when that group began laying out assigned program events of an IMP structure, the leadership of that contractor's office was livid. One of the prime contractor's subject matter experts walked up to the materials that a lieutenant colonel created with inputs from his superior officer and attached to the wall and, in front of the entire room of program staff, removed the materials and threw them away. Such a disrespectful act was shocking, and the subject matter expert continued to shock people when the lieutenant colonel, protecting his and his superior officer's inputs and working for the benefit of the program, picked the inputs out of the trashcan and began putting them back on the wall—and the contractor's subject matter expert threw them away again! The contractor demonstrated that, at that time, he was not prepared to handle true program content or a realistic IMP structure. After the tension subsided, the PMAG team was able to work side by side with members of the program team, guiding them in developing well-articulated program events, significant accomplishments, and accomplishment criteria.

That example shows how a program can craft an IMP at the right time (before the contract was established), but still face an impractical IMP as a result of applying wrong methodologies and experiencing dysfunctional cultures. In the example, there were some important lessons learned for the government and contractor personnel. Firstly, all program managers—from the lowest levels to the contracting company—need to know how to create an IMP. Secondly, it is challenging to create an IMP when the program is in flux and not measuring its performance at the standard level.

It's Never Too Late

In a more amicable IMP creation experience, dramatically different results were seen. A program was years into its life, but severe schedule slips and arguments over scope necessitated the creation of an IMP late in the program's life. The PMAG requested relevant program documentation and read the entire set of documentation to develop a deep understanding of the program's scope and requirements. In order to successfully assist the program, it was essential that all PMAG members were acutely aware of the current status of the program and the direction in which it was headed. The PMAG team worked separately from the program office for three weeks, and from halfway across the country, produced a 1,600 line-item IMP for the program office. It was not meant to be a final document; the idea was to provide a starting point for the wing's IMP creation efforts.

The PMAG team joined the wing commander in person after the draft IMP was delivered to the program office; and the group conducted IMP training workshops, assisted the IPTs in crafting their respective IMP inputs, and facilitated collaboration and discussions to increase understanding of program dependencies among the IPTs. Representatives from each IPT gathered at specific times each day to merge the

IMP details into a coherent and logical program IMP. The PMAG team kept the process moving by simultaneously developing integrated program risks and providing questions for the wing commander to seek clarification on program structure.

A surprising lesson learned from the teamwork exercise was that the collaborative discussions fostered mutual respect and enabled the program team (including less-experienced program/project managers) to develop a holistic programmatic understanding of the program. The daily, focused, and collaborative team execution is what made the IMP workshop successful. The use of application-oriented training created a real-time, interactive workshop in which understanding could be fostered, materials created, and results evaluated almost instantaneously. It was fascinating to see different IPTs approach the program from different perspectives then stand up for their pieces during the integration of the IMP details. The IMP integration process consisted of talking through opinions among individuals from different IPTs and choosing different IPT representatives each day for IMP integration. That bottom-up IMP integration process enabled the program office to develop a better understanding of dependencies among the IPTs and what the program truly required.

That example occurred as the program was undergoing the turbulence of funding and was late in the program's definitization (it was finally definitized approximately two years into development and after a major program realignment); however, it is never too late for the program office to understand its own program. Indeed, the program realignment may not have been necessary if an IMP had been created earlier in the program's life with clearly defined program events, significant accomplishments, and accomplishment criteria. The creation of the IMP is integral to the program's future success, even if it is created late in the program's development.

Importance of Application-Oriented, Hands-On Touch Time

It is important to note in those examples that true understanding of a program came from actual application-oriented touch time instead of didactic learning. Although some augmentees to the PMAG team had never seen an IMP before in their prior work experience, they demonstrated that they can learn the essentials of IMP generation through disciplined reading of the materials and guides available, through detailed training by experts on the PMAG team, and after long days of diligent preparation.

In the second IMP example, the wing commander was the program subject matter expert; and the PMAG simply brought focus, drive, content knowledge, and disciplined consultation through an understanding of the process. By doing so, the initial creation of the IMP was a struggle (a generous term!), and it wasn't perfect the first time around. But there are no failures in our business; only lessons learned

that can be shared between programs so we do not make the same mistakes twice. Mistakes and misunderstandings, especially between people, are to be expected; technology-based acquisition is, after all, rocket science.

The lessons learned from the examples given are applicable to other programs. The production of an IMP was relevant and necessary for both programs, despite the fact that the programs were at different points in their respective life cycles and had different needs. Both programs had problems—internal and external—that could be solved by proper planning and detailed execution. Any program acquisition officer in either wing could have picked up a guide or a program statement of work. But it was only through disciplined, focused activity and touch time did the program acquisition officers truly get involved and understood the program, and the entire program office benefitted as a result.

The second IMP example was in a much better position as a result of the proper execution of IMP creation activities. Because the PMAG continued to push for improvement, the learning opportunities did not stop; risks were raised, questions were developed, and the wing was in a better position to fine-tune the IMP. When the contractor produced its basis of estimates for the wing's review, the wing was in a much better position to analyze the material, manage the contractor, and proceed forward with all the necessary reviews until the end of the program because the IMP was well-understood by the entire program office. Most important, the wing's personnel were better educated and more capable as acquisition professionals, both in the short term for the benefit of that program and in the long term for the benefit of their careers and any other programs to which they'll move.

Building Our House

DoD's problems are not in its processes but in its abilities to use them. The department has rules guiding acquisitions

life cycles, there are guides to teach acquisition professionals how to perform their functions and reviews within the life cycle, and there are Defense Acquisition University courses to teach professionals how to read the guides. But we do not have understanding. What we often have is a

box-check mentality and an infatuation with a procedure for completing rather than ever truly *accomplishing* a task. We have programs in place without actual or logical IMPs and with unrealistic schedules. Is it any wonder, then, that so many of our programs go over budget and over schedule and under-perform?

The problems are not from lack of caring. By our nature, we are proactive and we look to solve problems or avoid them before they develop. But to build a house, we need more than good builders; we need good architects. We need to be able to read and understand the plans to reach a finished product. We need not only attention to details but also the understanding to know why details are important. Without good architecture, a house may look like a house, with walls and a roof and a floor to walk on. But that house will never be inhabitable, never accomplish its purpose, never stand up to code—not without significant rebuilding, schedule

delays, and cost bumps. None of us would want our houses built this way, and nor should we support our acquisition programs without good planning. The first step in solving the problems in our acquisitions community is good planning—not just in the process of making the plans (we have guides to tell us how) but in actually performing the substantive activities, in practical knowledge and attention to detail. Program management is an art, and a well-run acquisition is our craft. Through content-based execution—by creating and following our plans—we can strengthen our acquisitions community.


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Acquisition's Role in Tactics Development

Cmdr. Francis D. Morley, USN

An aerial photograph of a ship's wake on a dark blue ocean, with white foam trailing behind the vessel. The image is used as a background for the text.

What role should the acquisition, development, test, and evaluation communities play in tactics development? There are numerous tactics development centers of excellence in all the military services. For example, naval aviation currently has the Naval Strike Air Warfare Center, Top Gun, the Marine Aviation Weapons and Tactics Squadron, and operational test and evaluation squadrons that play a role in providing tactical guidance and recommendations to the fleet. Is there a place—or need—for the acquisition community to involve itself in operational tactics development? Yes!

The complexities of systems the Department of Defense is currently fielding are such that early development of employment guidance is essential for satisfactory achievement of initial operational capability. For example, the F/A-18 and EA-18G Program Office has recently fielded the active electronically scanned array radar and will be fielding future systems such as infrared search and track, the distributed targeting processor, and the EA-18G Growler. Those systems, and many others being developed throughout the military services, are substantially changing the way DoD employs weapons systems, and they are demonstrating greater processing power and rapid technology advancement. It often takes significant time to fully understand the systems and their provided capabilities and determine how best to use them.

Morley is the deputy program manager for PMA 265.

The result is that systems are being fielded with limited initial tactical guidance, leading to inefficient initial exploitation of new capabilities and frustration within the operational forces. Steps must be taken to address and overcome such problems. Specifically, program offices should attempt to determine seam issues and remedies in providing employment considerations and recommendations to the operational forces with newly fielded systems, and offices should determine a process to capture derived capabilities of newly fielded systems discovered in the operational forces so that future acquisition strategies can be adjusted. This article provides examples of how to do that.

Causes of Problems

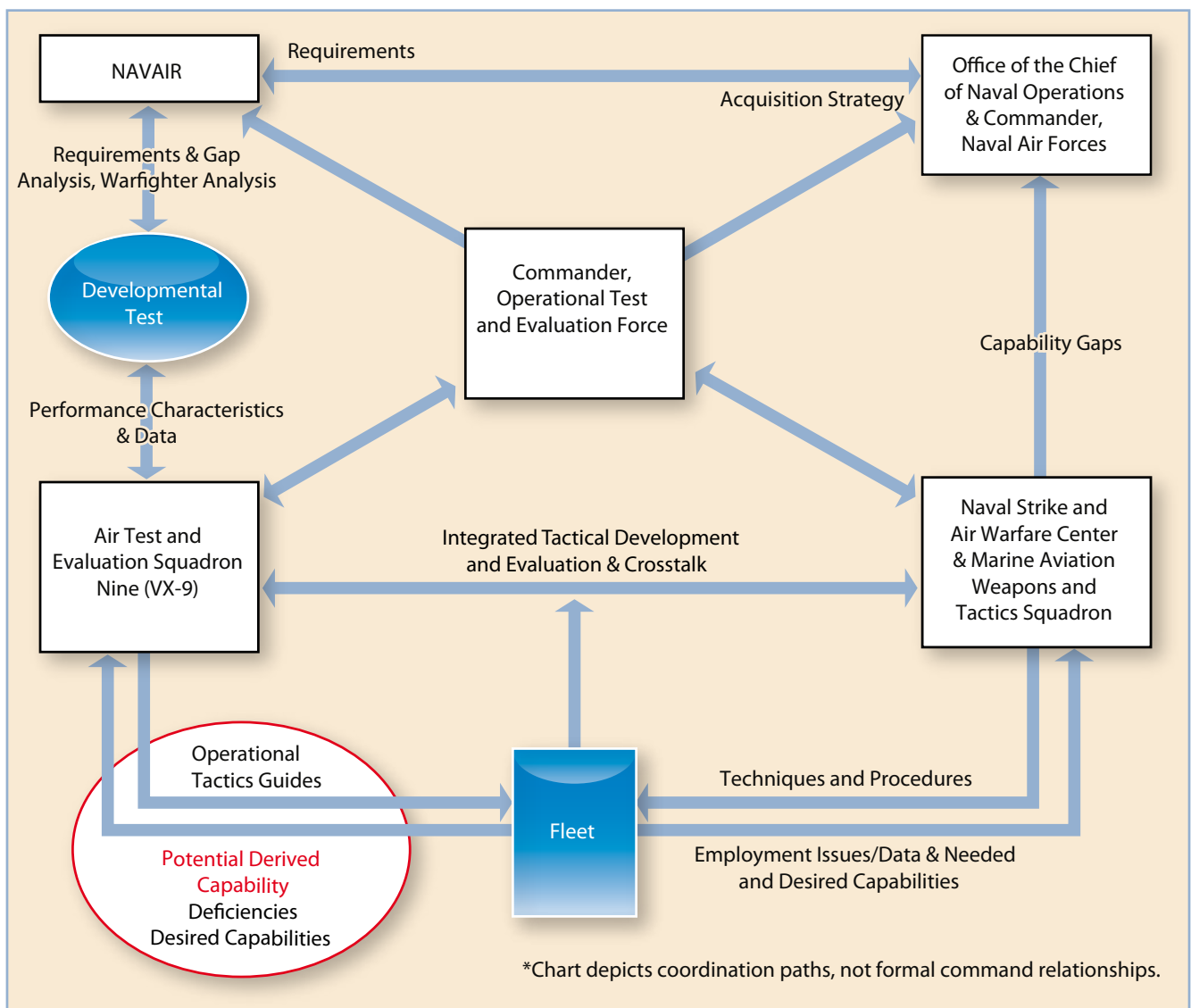
The reasons for the problems in implementing new systems are varied: system complexity; limited assets (personnel, budget, platforms); acquisition timeline not aligned with tactics development timeline; and not fully exploiting current

paths available as a result of lack of resources, time, effort, and awareness.

The result is lack of early employment guidance. In the absence of employment guidance or recommendations, the operational forces do what they have always done: press forward and execute. They develop their own tactics. They determine functionality in the new system that was never expected or realized in the test stage. They deploy and adapt the new systems to the current tactical employment framework and the mission at hand. However, that is a frustrating and inefficient process and does not always result in the most effective tactics and employment of new systems.

Within naval aviation, for example, the Naval Strike Air Warfare Center, Top Gun, and the Marine Aviation Weapons and Tactics Squadron develop and provide employment recommendations to the fleet. They do the job magnificently.

Feedback Loops



However, because of the demand pull from the fleet as new systems roll off the production line, members of the squadron often don't have a chance to get their hands on the new systems until well after the systems have been fielded in the fleet. Squadron members often have to wait until fleet systems come through Marine Corps Air Station Yuma or Fallon Naval Air Station (where the tactics development centers of excellence reside) on operational training events such as Navy Fighter Weapons School classes or Carrier Air Wing work-ups for deployment. Once the personnel have the ability to employ and gather enough data on the systems, they produce superb employment recommendations, as they always have. However, that takes place well after initial operational capability and often after first operational deployments of new systems.

DoD can help address some of those challenges within the construct of the organizations already in place. Operational evaluation organizations exist that can provide the initial employment guidance of newly fielded systems to the first users. They do this today to some extent. However, increased complexity of new systems, competing resource demands, and priority fielding pressures make providing guidance an ever-increasing challenge. Formal processes between the acquisition community and the operational evaluators that allow for early and robust transfer of system data and development efforts will help address that challenge and result in allowing the first operational user to receive stronger initial employment guidance.

Developing New Guidance

The operational test commands are the first to use new systems as they mature and complete development; therefore, it is logical to look to those commands for help in developing new employment guidance and recommendations. Current instructions and force structure allow for early operational guidance and derived capability feedback to come from the operational test squadrons and the operational test and evaluation force. Sticking with the Navy for our example, OPNAVINST 5450.332 states: "Commander, Operational Test and Evaluation Force (COMOPTEVFOR) Functions and Tasks—Develop initial tactics and procedures for employment of new systems that undergo [operational test and evaluation], or as directed by [the chief of naval operations], through liaison with Commander, Naval Strike Air Warfare Center." Then-Rear Adm. David Architzel, former commander, Operational Test and Evaluation Force (COMOPTEVFOR), was quoted in the COMOPTEVFOR Strategic Plan 2004-2007 as stating, "We have a unique opportunity to

introduce an operational perspective early in the system acquisition process to decrease the program modifications needed later in development. Limiting these modifications enhances the return on investment for the acquisition community and increases warfighter readiness by reducing the level of performance risk."

As a result of many of the causal factors previously discussed, the competing demands on resources for operational test and initial tactics development, the current fleet demand for systems, and the overall complexity of the new systems, COMOPTEVFOR cannot do its tasks alone nor put out required initial guidance in the timeline currently desired.

Bringing Tactical Operations into Acquisitions

The acquisition community can help address the problem, particularly in the area of timelines. Of course, certain causal factors and constraints will always exist, but DoD must look for ways to develop meaningful employment guidance in time to put it in the hands of the first operational units of a new system as they receive the newly fielded systems. The acquisition community is involved in the development of game-changing systems years in advance of fielding. The future threat is assessed in threat analysis efforts. Gap analysis is conducted

to determine need. Warfighting analysis is conducted to determine requirements. Flight plans and road maps are produced. Functional and technical solutions are developed. Funding is budgeted. All those tasks are done well in advance of a system's coming off the production line, being tested and evaluated for operational effectiveness and suitability, and being fielded to the operational forces—and it is where the acquisition community can make a difference.

Acquisition efforts involve knowledgeable professionals who understand the systems better than anyone and have thought through how to initially employ the systems well before operators become involved. DoD must exploit the efforts of acquisition personnel and make their analyses and efforts available to the operational testers and tactics, techniques, and procedures centers of excellences across the department. DoD must push such information forward and better develop formal communication paths between these various agencies so they can use that data in advance of receiving systems and author initial employment guidance and recommendations earlier.

Some of that is being done today with recently established integrated test and evaluation processes that bring the op-

What role should the acquisition, development, test, and evaluation communities play in tactics development?

erational test community into the loop early in the developmental test and gradually increase the operational test community's involvement as the system continues to mature through development. That has had a significant effect on increasing the maturity of the system through development by obtaining the operational viewpoint early while also providing the operational tester with a better understanding of the new system earlier. The EA-18G Growler is a successful example of that, as the program adopted a construct of integrated test and evaluation throughout its development and came through its initial operational test and evaluation with an "effective and suitable" assessment from COMOP-TEVFOR.

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The Next Level

That is just a start. Providing technical data, warfighter analysis, and requirements-driving employment concepts developed by the acquisition community to the operational test community prior to testing, or even the delivery of test systems, would allow the operational testers to begin to develop employment guidance even earlier than is done today.

In addition, communication paths can be better used to provide feedback from various agencies to the acquisition community regarding derived capability determined by operational forces and others. Often, the operational forces determine a capability in a system not previously known. The capability may very well be in a future acquisition roadmap. Timely feedback on such issues will allow adjustment of current and future acquisition strategies and, ultimately, result in budgetary savings.

The figure, Feedback Loops, is not intended to depict formal command relationships or chain of command. Rather, it identifies the key organizations involved in the fielding of a

new system (within the naval aviation community, which is the example provided) and suggests possible coordination paths to develop better and in a more timely manner useful tactics and employment guides and recommendations of today's complex systems. The relationships depicted in the figure all exist today in some form or another.

Many are somewhat weak, however, because of resource constraints, priorities, or informal nature. For example, the transfer of employment-related data derived from years of development efforts from Naval Air Systems Command and the program offices to the developmental testers and into the hands of naval aviation's operational tester, Air Test and Evaluation Squadron Nine, is not as robust or as formal as it should be. Information and data transfer is more relationship-based than reliant on formal process. Data are often provided once a system is in operational test instead of months or years earlier, when advance preparation can result in more robust employment guidance. Additionally, the integrated tactical development and evaluation between the operational testers and the Employment Guidance Center of Excellence—Naval Strike and Air Warfare Center is somewhat challenged as a result of competing priorities, physical separation, and insufficient resources. Finally, there is no formal feedback chain of derived capability back through the operational testers and to the developers and acquirers; if better defined, such a feedback chain would possess significant opportunities to save acquisition resources.

All of those examples demonstrate areas where improvements could be made to existing organizational relationships and processes to make a real, positive effect on providing more timely employment guidance to initial operators of newly fielded complex systems. In all of the examples, the acquisition community has involvement and can play a direct role in improving tactics development.

By having the acquisition community become more involved in tactics development, DoD can address and improve a current deficiency in the fielding of complex new systems: the development of strong employment guidance. By further developing communication paths with the appropriate agencies, the department could receive feedback to help it adjust acquisition strategies and save dollars. I encourage everyone within the acquisition community to continue to nurture and formalize their communications with the operational testers; tactics, techniques, and procedures centers of excellence; and operational forces to look for opportunities to push information, analysis, and data to them well in advance of system fielding, helping them do their job better and earlier. Ultimately, such efforts will result in a more useful product to DoD's operational forces and increased mission effectiveness earlier in the life cycle of complex systems.

The author welcomes comments and questions and can be contacted at francis.morley@navy.mil.



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It's Not a Big Truck

Examining Cyber Metaphors

Lt. Col. Dan Ward, USAF



Former Senator Ted Stevens became the butt of many late night talk show jokes and achieved YouTube immortality in June of 2006 when he said the Internet is “not a big truck. It’s a series of tubes.” Along with inadvertently creating a new Internet meme [*a catchphrase or idea that spreads online*], the senator’s unfortunate attempt to explain the Internet highlights both the central role of metaphor in human understanding and the confusion surrounding this global collection of interconnected computers.

Ward is the chief of process improvement and reengineering in the Acquisition Chief Process Office, Office of the Deputy Assistant Secretary of the Air Force for Acquisition Integration. He holds degrees in systems engineering, electrical engineering, and engineering management. He is Level III certified in SPRDE and Level I in PM, T&E, and IT.

Regular readers may recall that in the November-December 2008 issue of *Defense AT&L*, we examined the topic of metaphors in an article titled “Metaphors Are Mindfunnels.” Inspired in equal measure by George Lakoff and Mark Johnson’s book *Metaphors We Live By* and the Matrix movies, the article discussed the way metaphors expose and obscure various aspects of reality. Building on Lakoff’s and Johnson’s observation that “the primary function of metaphor is to provide a partial understanding of one kind of experience in terms of another kind of experience,” we went on to explain that a “good metaphor improves our understanding of the environment and leads to constructive, productive, positive action. It reveals more than it hides—or at the very least, it reveals the critical aspects while obscuring the less important aspects.” We coined the term “mindfunnels” in the article to illustrate the way metaphors influence our perception of the world around us.

Cyber Metaphors

Senator Stevens’ infamous tube metaphor got us thinking about cyber metaphors and the way they shape our understanding of the Internet. But let’s be clear—when the senator described the Internet as a series of tubes, he wasn’t offering a literal description. Instead, he was metaphorically describing one thing (the Internet) in terms of something else (a series of tubes). The truth is, his imagery was not entirely incorrect, but neither was it entirely complete. Like all metaphors, his description expressed only “a partial understanding.” Perhaps there are other metaphors we could use instead, metaphors that might shine a useful light on some of the more critical aspects of the Internet and funnel our perceptions in a productive direction ... metaphorically speaking, of course.

As we move forward on this path of understanding and awareness, it is important to be mindful of as many hidden metaphorical constructs as possible. So before we get too far down the line, we need to introduce a placeholder word. Instead of referring to the Internet or cyberspace, let's just call it the Thing for now. This is necessary because the terms cyberspace and Internet are themselves ... (drum roll please) metaphorical!

Location versus Tool

Upon closer examination, the word "cyberspace" is built on a <thing is location> metaphor. In that framework, the Thing is viewed as a geographic place in which people can visit and move around (cyberspace even contains the word space). Just look at the language we use to talk about our interactions when we think of the Thing as cyberspace: we go online, visit Web sites, count the number of visitors to our home pages, build store fronts, and use social media sites to establish our presence in this parallel world. Terms like "hosting" and "domain" are further examples of the geographic metaphor.

On the other hand, the word "Internet" is based on a <thing is tool> metaphor. The tool in question is a connective network (a series of tubes, if you will) or a web we use to enable our business dealings, maintain social connections, and satisfy our information requirements. In other words, it is a network to use, not a location to visit. We talk about how it improves communication, lowers costs, and shortens timelines—those are attributes of a tool, not a location. Of course, the lines between these metaphors are occasionally blurred, and people sometimes use location words when talking about the Internet and tool words when talking about cyberspace. That is known as a mixed metaphor.

Cyber Metaphor in Government

As you might expect, various parts of the federal government use different cyber metaphors, many of them a variant on the popular geographical construct. The Department of Defense, for example, uses the term cyberspace, but views the Thing as a particular kind of place known as a battlefield. In that metaphor, cyberspace is a location where combatants go to perform reconnaissance, collect intelligence, attack targets, and take defensive actions. The military talks about training cyberwarriors and building a fleet of cybercraft to operate in this place. The Air Force, in particular, describes cyberspace as a third battle domain, alongside

air and space. This <thing is location> idea may indeed be a good metaphor, and it is certainly the predominant one of the moment. However, like all metaphors, it both conceals and reveals. Upon closer analysis, we may discover that it is filtering out something important. More on that in a moment.

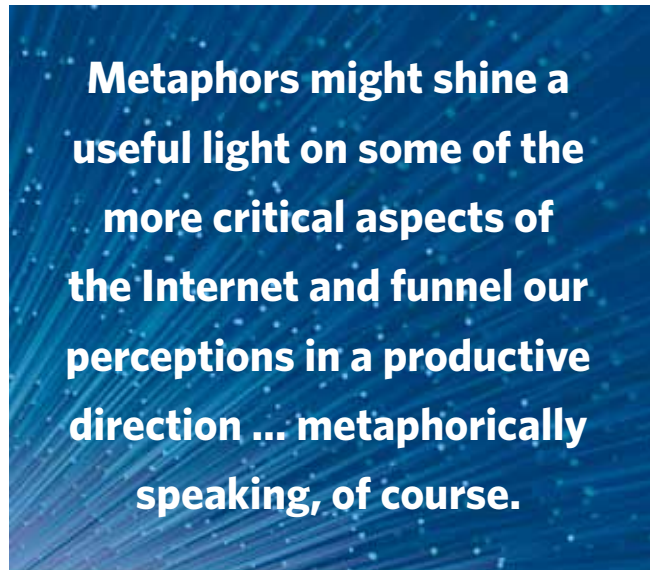
Law enforcement agencies like the FBI also think of the Thing as cyberspace, but view it as a potential crime scene instead of a battlefield. It is a place where they go in order to perform investigations; gather evidence; protect potential victims; and assess the means, motive, and opportunity of suspects. The common underlying <thing is location> metaphor creates a lot of similarity between the military and law enforcement interactions

online, but the different battlefield/crime scene metaphors lead to a divergence in both understanding and behavior. While gathering intelligence and gathering evidence may both be viewed as data collection activities, the rules surrounding each are quite different; and thus, the tools, techniques, and methods applied will differ significantly. If the FBI thought it was entering a battlefield, or the military thought it was operating in a crime scene, their behaviors would probably be quite different.

The Power of Metaphor

Something funny is going on here, and it has to do with the nature of metaphor. Recall that a metaphor describes one thing in terms of something else. It does not describe the thing in terms of itself or its constituent parts. That is what literal descriptions are for. Ironically, that means the one thing a metaphor can definitely tell us is what the object is not. We can say "a book is a gateway to a new world" only because it is not a gateway to a new world. Literally speaking, a book is actually just a 12-ounce stack of paper with ink on it. And yet, the metaphorical description tells us more about the experience of reading a book than the scientifically literal description does. This is the power—and the danger—of metaphor.

So, when we say the Thing is a parallel world, what we are actually saying is it is not a parallel world, just as a book is not literally a gateway. We metaphorically describe it as a place because it is not a place. We can think of it as one for convenience, but we must not mistake the imagery for a literal description. This means Senator Stevens was right on at least one count. The Thing—cyberspace, the Internet,



the magical series of tubes—is not a big truck. It is also not a series of tubes or a location, nor is it a tool, a network, or a web that stretches around the world. It is clearly useful to think of the Thing in these terms, but these images are metaphorical, not literal.

The Illusion of Real

Let's say this again: metaphors are not literal descriptions. They are convenient fictions. We all know this, of course, but it bears repeating for one big reason: Many of the metaphors we use are invisible to us. When we fail to see metaphors for what they are, we run the risk of mistaking things for what they are not. As Albert Einstein explained, "One is in danger of being misled by the illusion that the 'real' of our daily experience 'exists really.'"¹ He was talking about relativity, but his warning applies to our other mindfunnels just as well. His warning certainly applies to the CyberThing.

Here's the rub: People involved in national-level cybersecurity efforts, using the <thing is location> metaphor, often talk about "defending the borders of cyberspace." That is a natural conclusion to make, given the imagery involved. Places have borders. Cyberspace is a place. Therefore, it must have a border, and that border must be defended. Unfortunately, this is an instance where the geographic imagery breaks down, because the Thing doesn't recognize boundaries or borders. Not really.

Yes, a particular network may have colorfully named features like firewalls, but it still sends 1's and 0's over many of the same wires as other networks. It may have gateways and backdoors, but it still relies on routers, servers, and various hardware components that are simultaneously a critical part of the network and are often, in a very real sense, on the other side of the "border." Similarly, two networks operating at different classification levels (to use a theoretical example) may appear to be independent, but in reality, are sufficiently intertwined that we can't always say for sure what would happen to one if the other goes down. So much for boundaries. Furthermore, a person operating in one domain may appear (deliberately or inadvertently) to be in a different domain altogether. So, the lines are not as neatly drawn as they are in the world of physical geography.

This does not mean the <thing is location> metaphor is entirely wrong. It simply means it is only a partial representation, a half-truth, a convenient fiction. In other words, it is a metaphorical representation, not a literal description. We ignore this fact at our peril, and people who publically misunderstand the Internet run the very real risk of inadvertently creating their very own meme. That's not nearly as fun as creating a meme on purpose.

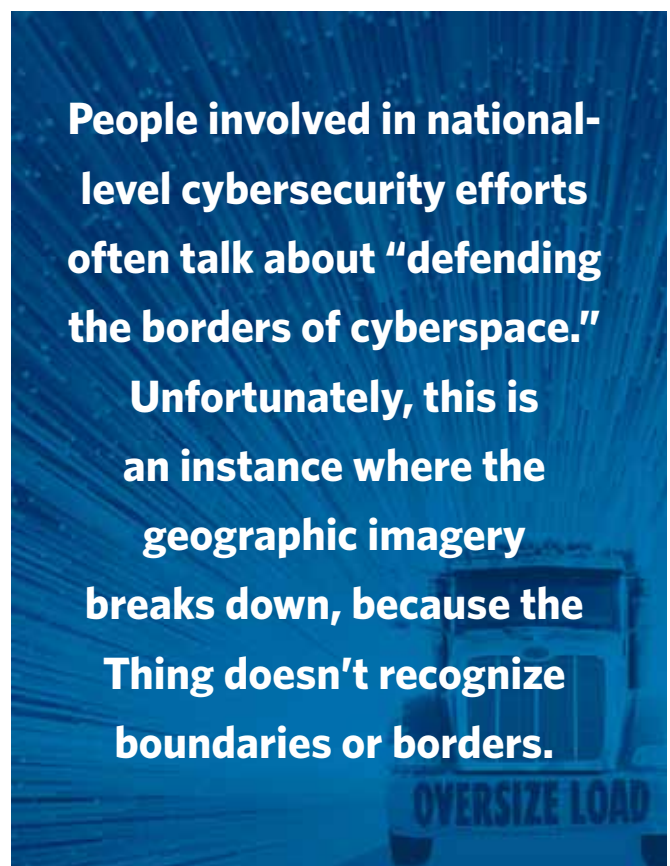
Mixing and Matching

OK, time for some good news. While metaphors offer only partial explanations, we should also bear in mind that they

are not inevitable. For any given entity or experience, we can create a number of metaphors. We can even use more than one at a time, mixing and matching them in such a way as to reveal with one metaphor an aspect that is concealed by another.

So, while the <thing is location> metaphor (and the accompanying term cyberspace) has much to commend it, it might be worthwhile to consider some alternatives. These metaphors need not replace the concept of the Thing as a location. Rather, when pondered in parallel, they might help us get a better handle on what this Thing really is.

CyberTool: If we use a <thing is tool> metaphor, we might try to make the handle more ergonomic—or we might develop different types of handles for different situations. We might consider different uses, attachments, and applications for this tool, just like a vacuum cleaner or Dremel™ tool. We might try to reduce friction among the components. We could try to fill in the blank: "If the only tool you have is an Internet, all your problems look like _____." And just as the <thing is location> imagery has submetaphors like battlefields and crime scenes, the <thing is tool> approach might produce more specific images, such as the nearly literal <thing is communication system> or the more fanciful <thing is vehicle>. If it was a vehicle, where would it take us? Where is the gas pedal or the break? Who has their hands on the steering wheel? Is it a bus, a train, or a motorcycle? In what sense might it even be a big truck?



**Metaphors are neither
literal nor inevitable.
Any given experience or
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in nearly boundless ways.**

CyberPlant: Using a <thing is plant> metaphor, we might find ourselves considering things like sunlight, fertilizer, and water. If the Internet is vegetation, what fruit or flower does it produce? Does the term pruning have any meaning in this framework? What cultivation do we need to do in order to achieve our objectives? Is it a vine or a tree? Is it grass? Dandelions? Kelp?

CyberPerson: What if we think of it as a person? Would we describe it as godlike or childlike ... or both? Would it be a Frankenstein's monster or a Superman? A golem or a genie? A schizophrenic mental patient or a Zen master? Is it more like John Henry or Johnny Appleseed? Could it be trained and educated? What language does it speak? What does it need? If futurist and author Ray Kurzweil is right that *The Singularity is Near* (as he titled his 2005 book about artificial intelligence), this metaphor might very well be worth pondering.

The point is that metaphors are neither literal nor inevitable. Any given experience or entity can be metaphorically described in nearly boundless ways. Each of these figurative descriptions will convey certain truths and attributes while downplaying others. That does not mean we should avoid metaphors. In fact, we could not abandon the use of metaphor even if we wanted to because metaphor is the key to understanding just about everything. It's just how our brain works. Metaphor helps us make sense of new experiences and provides an imaginative richness and depth far beyond merely literal descriptions. A book is more than a stack of paper and ink, just as the Internet is more than a global collection of computers joined by wires. But we must be aware of the metaphors around us. And when it comes to the Internet, the one thing we need to keep in mind is this: It is not a big truck.

The author welcomes comments and questions and can be contacted at daniel.ward@pentagon.af.mil.

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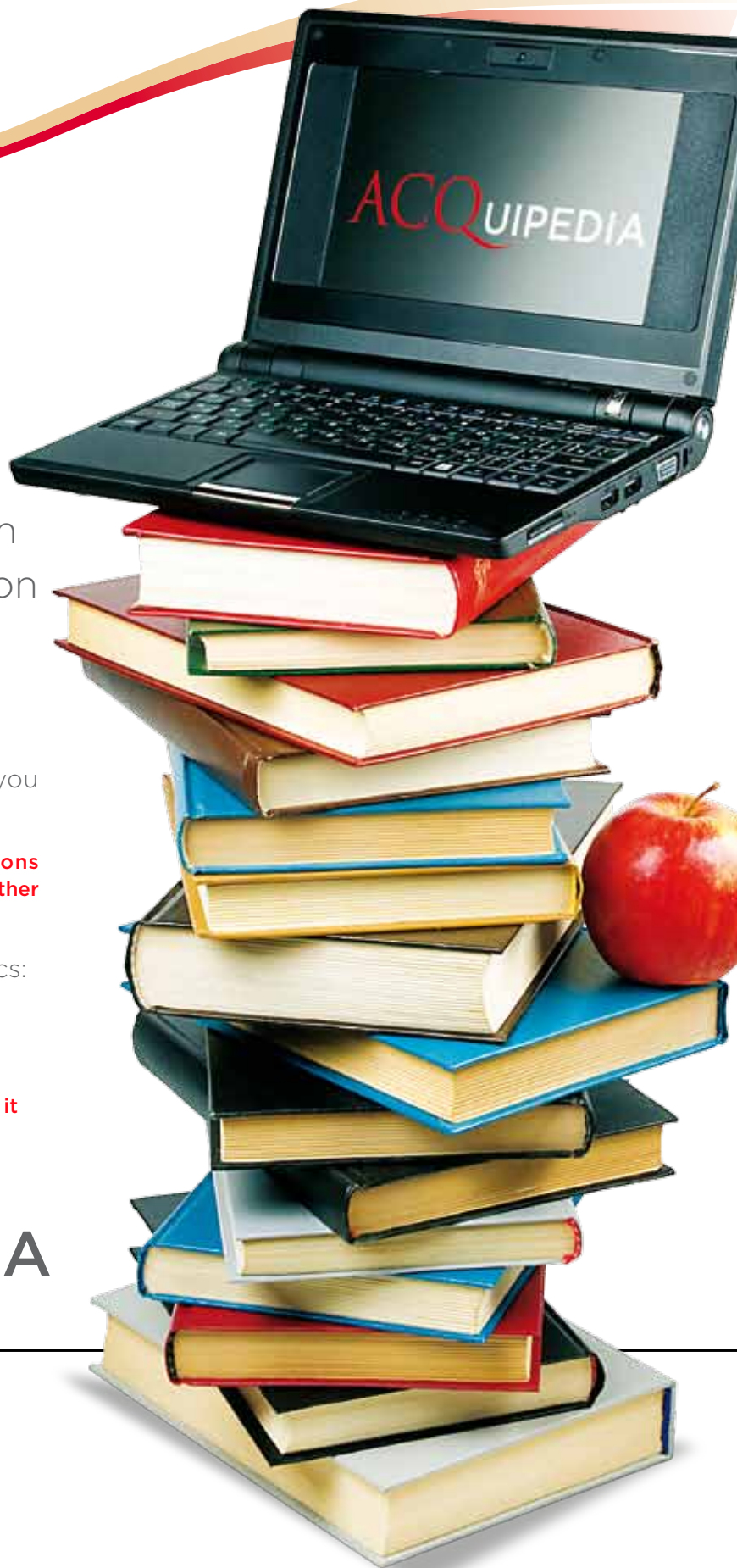
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Meeting the Leadership Challenge

Aberdeen Proving Grounds

George Liscic ■ Robert Melvin ■ Beverly Obenchain

Aberdeen Proving Ground, Md., is in the midst of a transformation unlike any experienced since it opened in 1917. The Department of Defense Base Closure and Realignment is the immediate driver of change as more and more facilities close and their operations are moved to APG. There have been risks and rewards for many impacted by the changes resulting from BRAC, particularly with the leadership development required by those changes. This article examines the many leadership challenges, risks, and opportunities being faced at APG, and it provides examples of leadership development that can be emulated by other DoD organizations and locations.

The Challenge

The primary challenge facing APG leadership is the need to develop future leaders to implement change. APG Senior Executive Service (SES) leadership envisions developing a sustainable learning community of leaders to successfully carry APG into the future. Every person and every organization feels the impact in

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some way. According to Gary Martin, executive to the commanding general, Research, Development and Engineering Command, "Over the next two to three years, we expect a number of new organizations and 8,000 new government employees at APG due to BRAC. To compound the challenge, nearly 50 percent of our existing workforce will be retirement-eligible within the next five years. While BRAC will provide significant brick-and-mortar enhancements as new facilities are constructed for the incoming organizations, our real challenge will be sustaining the necessary workforce. We need to quickly develop more leadership at all levels to ensure successful adaptation of our people and our culture."

"We must work to help our people out of their silos so they can work together to create a new culture, a new community at APG that more effectively meets the changing needs of the warfighter," said Joe Wienand, director, Program Integration, U.S. Army Edgewood Chemical and Biological Center. "The magnitude of growth assures that the current culture cannot survive unchanged."

Developing top performers into leaders and building an effective leadership learning community is a challenge. How does one go about doing that? It is accomplished by creating a program with multiple levels of support, engagement, and accountability. It is accomplished by having top leaders encourage the emerging leaders and having emerging leaders engage in developmental opportunities, self-observation, and individual coaching with the support of their supervisors. To grow a sustainable leadership learning community, many APG tenants saw a need to participate in the first APG leadership program as well as future programs.

Action Science

For the first APG leadership program, top APG leaders envisioned a sustainable leadership learning community with all APG organizations involved, and leaders asked the Office of Personnel Management to help them. An OPM faculty team accepted the challenge to develop and implement an innovative leadership program, and the team decided to apply the principles of action science.

Action science—originally developed by Chris Argyris, Robert Putnam, Diana McLain Smith, and Donald Schön—is a strategy for designing situations that foster effective stewardship of any type of organization. It is a framework for learning how to be more effective in groups. It aims to help individuals, groups, and organizations develop a readiness and ability to change to meet the needs of an often-altering environment. To help individuals in groups to learn how to overcome barriers to organizational change, action science goes beyond simply focusing on improving the participants' problem-solving or decision-making skills. It also looks beyond making incremental changes (e.g., identifying opportunities; finding, correcting, reducing, or eliminating threats) in the external environment. Action science focuses on look-

ing inward, learning new frameworks, and establishing new routines. Once that is accomplished, participants are able to look outward with fresh perspectives and ideas.

Most leadership programs are classroom lecture and practice experiences. Those programs are based on theoretical examination of professional leadership philosophies. It is hoped that participants' experiences in such programs result in post-program implementation, but there is no direct pathway to confirm that this happens. Action science is different. The classroom learning is a prelude to the learning that takes place in the community-based projects and on-the-desk projects. The theoretical examinations are drawn out through individual coaching, Socratic dialogue, and resultant periodic self-examination. The focus is on issues at hand and outcomes as reflections of leadership philosophy made concrete through action. Then the cohort provides a community in which learning is stimulated, encouraged, fed, and assimilated.

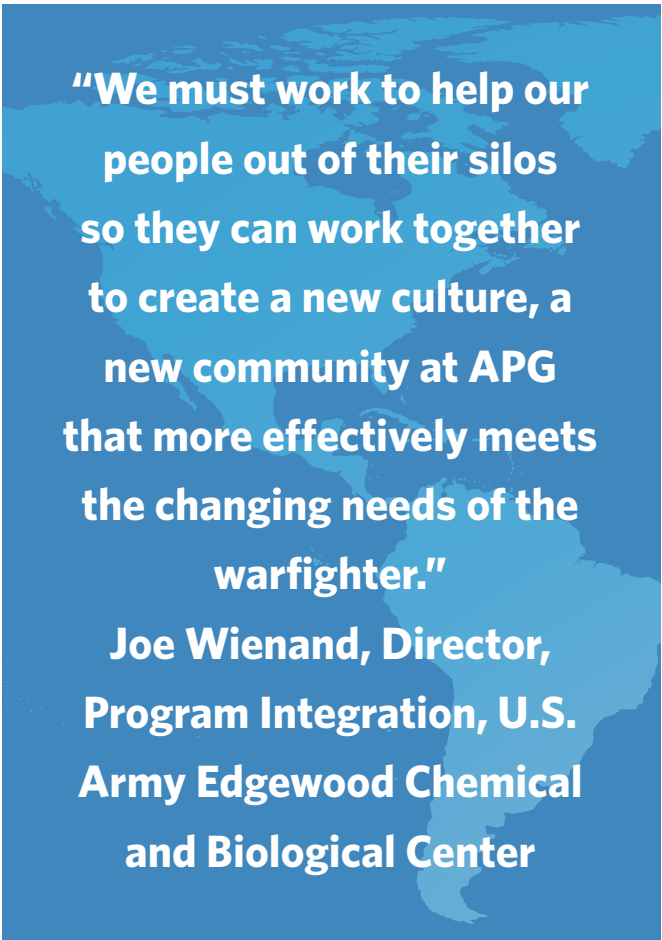
SES members from many APG tenant organizations agreed to try that leadership development approach and nominated some of their aspiring managers to participate in the program for one year. Participants accepted the challenge of entering the year-long program at a time when changes at APG were overwhelming, and their workloads reflected this status.

George Liscic, an OPM training and development consultant and co-author of this article, agreed to lead the customized development of the program. According to Liscic, "It was a rare opportunity. Our desire to expand leadership development based upon action science coincided with the opportunity offered by APG who had a clear vision of what they wished to accomplish."

Designing the Program

Once OPM was committed to the program, the next step involved creating a faculty team that would be willing and able to design the leadership program and to facilitate all activities for a program on a regular basis over a one-year period. The OPM faculty team based design, development, and delivery of the program on four key assumptions:

- The learning experience would be real-time with real challenges.
- The experience would deliver real results that were significant and meaningful to the participants, their bosses, and their bosses' bosses. Results would be observable and measurable. The impact of the training would be seen by individual participant, the cohort team, the participant's organization, and the larger APG community and beyond (e.g., Army, DoD levels).
- The transfer of responsibility and accountability from the APG SESers, supervisors, and OPM faculty team to the participants was critical and needed to be accomplished as quickly as possible.



"We must work to help our people out of their silos so they can work together to create a new culture, a new community at APG that more effectively meets the changing needs of the warfighter."

**Joe Wienand, Director,
Program Integration, U.S.
Army Edgewood Chemical
and Biological Center**

- The values and norms created by this cohort would reflect civil service values, which called one and all to serve others for a cause or causes greater than themselves.

Developing the Cohort

While the faculty team was fleshing-out the customized design of the program, Martin and Weinand were busy persuading their direct reports and other APG SESers to commit themselves to program oversight and to select some of their best people to become program participants. The SES group committed their time, effort, and people to the program because they believed major change was needed and because they believed that a new approach would move APG into the future. Thus, the process of selecting the 31 people who would constitute the first APG Leadership Cohort Program began.

The individuals selected for the cohort program came from 12 different organizations with backgrounds in science, engineering, facilities, human resources, acquisitions, and operations and other fields. Predominantly, the managers were at the level of GS-15, DB-IV pay-band, or equivalent, with direct reports or in a senior technical role. Some had been working at APG for many years while others were in the process of moving to APG.

Structural Elements of the Program

Action science requires learning where real leadership occurs—where a person works and lives outside the classroom. It also requires that each person have support, encouragement, feedback and accountability from multiple dimensions. Those fundamentals drove specific structural design elements of the program:

- All activities would be held at APG.
- There would be SES leadership and supervisor engagement, support, and visibility throughout the program to build an APG community.
- Learning groups would come from different organizations, creating cross-organization connections.
- Individual coaching would foster emotional intelligence and application.
- Participants would receive on-the-desk projects. Those were real projects that added value to an organization. The projects served as one of the practice fields for the participants. Participants learned more about their leadership capacity as well as got the opportunity to experiment with different approaches.
- There would be community-based projects benefiting the APG community and typically not in participants' area of expertise.
- There would be cohort facilitation that explored all facets of leadership and action learning with an emphasis on leadership beginning inside each person.

Each person observed his or her own leadership behaviors, skills, energy, and emotions; and then experimented with new approaches to achieve goals, lead others, and complete tasks in different ways. There was particular focus on learning how to detect and correct error as quickly, efficiently, and effectively as possible. Many times in the classroom experiences, participants were given the opportunity to stretch their perspectives and develop new mental models as a result of real-time feedback received from an APG SES leader who remained with participants throughout the program as well as from SES guest speakers. Ensuring that one does not carry forward obsolete views of reality is an important foundational aspect of the action science learning strategy.

Participants completed several assessments (e.g., Insights Discovery® evaluator and 360° assessments) and spent time with their coach reviewing those reports and developing specific goals for themselves. Some participants shared their reports with their supervisor and others with their direct reports. They also spent time creating their own personal energy management plan that would enhance their ideal performance state.

Converting the knowledge they gained in the classroom into action, participants were asked to brief their recommendations for APG-wide community-based projects to APG SESers at a board meeting. Participants shared their evaluations and assessments of the as-is conditions of several important APG community scenarios, and proposed

recommendations for solutions accompanied by the value proposition that each project would have for the wider APG community. In some cases, the SES responses validated the participants' assessments and evaluations, and in some, it did not. The briefing experience as well as feedback on the recommendations provided the teams with real-time consequences of their actions and opportunities to reflect on their performance. They could learn how to better respond to emerging challenges that took the form of disagreement, changing environmental conditions, or faulty evaluations and assessments. Participants had responsibility for working together on the six approved community-based projects, ensuring implementation and working toward completion.

Vision, Assumptions, and Values

The vision was to create a sustainable leadership learning community that would help all APG organizations work more effectively and successfully together in the future. The key assumption that energized the program was that you can take a core faculty team and a core senior leadership group, add a group of very sharp participants, and create a self-sustaining leadership learning community.

It was not assumed that every participant was being groomed for higher positions. Instead, it was assumed that each participant could become a more effective leader in any capacity. The only assumption was that participants would want to become better at leading themselves and others.

Peter Senge, MIT professor, founding chair of the Society for Organizational Learning, and author of *The Fifth Discipline*, captured the essence of the program when he said, "When people have a practice field where they can relate to each other safely and playfully, where they can openly explore

difficult issues, they begin to see their learning community as a new way of managing."

The relevant values/beliefs shared by the core faculty team and the core senior leadership team were:

- We believe the federal government is a force for good.
- We believe federal employees can set a new standard for leadership in the United States.
- We believe people want to do their best and will grow if offered the opportunity and guidance.
- We believe that by working together we can create a better model for leadership development as well as an effective leadership learning community.

Status Report

The program has been under way since March 2009. Participants have experienced a shift in their perspectives about the program as well as their perspectives of their own leadership capacity. For example, at the start of the program, faculty members talked about the group being a cohort and the idea that having some ground rules would be helpful. Participants had difficulty seeing the group as a cohort or understanding why they might need ground rules. Near the end of the program, participants were involved in a variety of dialogues talking about how they were a cohort and wanted to continue as a cohort beyond the formal closure to their program.

The program has helped participants manage their personal energy—and therefore their activities—in a healthier and more productive manner. For example, some began spending more time engaging in activities they felt passionate about and changed habits to create and support a healthier mind and body. One participant commented that he had lost weight and now finds his healthier diet much more delicious and supportive of his energy throughout the day. Others have found that time for reflection offers more than they realized and have incorporated regular time to reflect each day.

The community-based projects that were presented at the SES meeting are now being developed. All projects address top priority issues facing APG and are supported by senior leadership. The cohorts are expected to continue working on their projects even after the program ends.

The formal program is due to complete in February 2010. At that time, there will be a broader sharing of learning, accomplishments, and ideas for the future. It is expected that this first cohort will take a leadership role in supporting the next cohort program. The sustainable, leadership learning community is growing and assimilating.



The authors welcome comments and questions and can be contacted at gliscic@opm.gov, rmelvin@du.edu, and obenchain@obenchain.net.

Joint Interoperability Certification

What the Program Manager Should Know

Chris Watson



(Note: This article is an updated version of "Joint Interoperability Certification: What the Program Manager Should Know," by Phuong Tran, Gordon Douglas, and Chris Watson, Defense AT&L, March-April 2006. This article reflects new policy passed since 2006.)

Making sure systems can work together during joint operations has been a key problem for the Department of Defense. Interoperability testing and certification of systems are important because they help program managers consider such things as whether a system can work with systems belonging to other military services without unacceptable workarounds, and whether the systems conform to broader architectures designed to facilitate interoperability across DoD.

Watson serves as outreach director for the Joint Interoperability Test Command. His experience encompasses over 20 years in the operation, training, and testing of military IT systems.

DoD's process for certifying interoperability of information technology and national security systems (NSS) has evolved over the past few years. In order for this process to be effective, stakeholders must examine whether certification has been planned appropriately and whether a true understanding of the process exists. Program managers who have integrated this process into their overall development and testing schedule have normally transitioned into the field smoothly and provided the best support to their users. Program managers lacking a good understanding of the process have encountered interoperability problems too late in the acquisition cycle, causing delays and cost overruns, and worst of all, contributing to deadly mistakes at critical times. Program managers must understand the process and use it to their advantage. To accomplish this, a few basic questions need to be answered.

What is Interoperability?

As defined by DoD policy, interoperability is the ability of systems, units, or forces to provide data, information, materiel, and services to, and accept the same from, other systems, units, or forces; and to use the data, information, materiel, and services so exchanged to enable them to operate effectively together. IT and NSS interoperability includes both the technical exchange of information and the end-to-end operational effectiveness of that exchanged information as required for mission accomplishment. Interoperability is more than just information exchange; it includes systems, processes, procedures, organizations, and missions over the life cycle and must be balanced with information assurance.

What is Interoperability Certification?

Interoperability certification is the process of ensuring that a system meets the joint interoperability requirements of its users. It includes the collection of the data (test) necessary to determine (evaluation) whether or not the system conforms to applicable interoperability standards and can effectively exchange all required information with all pertinent systems.

Why is Interoperability Certification Necessary?

Interoperability certification assures the warfighter that the combatant commander, Services, and agency systems can interoperate in a joint, combined, and coalition environment.

Who Certifies That a System is Interoperable in a Joint Environment?

The Joint Interoperability Test Command, an organizational element of the Defense Information Systems Agency, has responsibility for certifying joint and combined interoperability of all DoD IT and NSS. JITC facilities are strategically located at Fort Huachuca, Ariz.; Indian Head, Md.; and Falls Church, Va. The diverse capabilities and resources associated with each respective location

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allow the armed services to have access to a dynamic environment for laboratory tests and onsite field evaluations.

What Systems Need to be Certified?

All IT and NSS that exchange and use information to enable units or forces to operate effectively in joint, combined, coalition, and interagency operations and simulations must be certified.

When Should Systems be Certified?

All systems must be certified before they are fielded. Fielded systems must be recertified every four years or after any changes that may affect interoperability. The program manager should contact JITC early in the acquisition program to ensure that certification is timely and cost effective.

What Does Certification Involve?

JITC follows the processes outlined in the Chairman, Joint Chiefs of Staff, Instruction 6212.01, "Interoperability and Supportability of Information Technology and National Security Systems," to perform its joint interoperability test and certification mission. The document establishes policies and procedures for developing, coordinating, reviewing, and approving IT and NSS interoperability needs. It also establishes procedures for performing interoperability certification using a new, net-ready approach.

Generally, the interoperability certification process consists of four basic steps. Joint interoperability testing and evaluation can be a repetitive process as conditions change. The steps are:

- Identify (interoperability) requirements
- Develop certification approach (planning)
- Perform interoperability test and evaluation
- Report certifications and statuses.

The Joint Interoperability Test Command has responsibility for certifying joint and combined interoperability of all DoD IT and NSS.

Identification of Interoperability Requirements

Establishing requirements is a critical step, and system sponsors must resolve any requirements/capabilities issues with the Joint Staff, J-6. The Joint Staff, J-6 must certify specific requirements/capabilities if system interoperability certification is required. JITC provides input to the J-6 requirements/capabilities certification process and uses the results as the foundation for the remaining three steps of the interoperability certification process.

The capabilities development process has been strengthened with the publication of CJCSI 3170.01, "Joint Capabilities Integration and Development System (JCIDS)." The JCIDS supports the Joint Staff and the Joint Requirements Oversight Council in identifying, assessing, and prioritizing joint military capability needs. As prescribed by the JCIDS process, JITC will participate in the technical assessment of all IT and NSS capability and requirements documents to ensure interoperability requirements are specified in measurable and testable forms. JITC assists in identifying requirements contained in sources such as the program's capability development document, capability production document, information support plan, tailored information support plan, or information support plan annexes.

Once requirements are identified, JITC develops a joint interoperability requirements matrix and confirms it with the appropriate operational command or agency. This matrix then serves as the basis for development of the certification approach.

Developing the Certification Approach

JITC's evaluation strategy will identify data necessary to support joint interoperability test certification as well as the test events/environments planned to produce that data. The current evaluation strategy is driven by DoD's architectural shift towards a network-centric operational environment.

The foundation of DoD's net-centric environment is the Global Information Grid. The GIG is the globally interconnected, end-to-end set of capabilities, processes, and resources for collecting, processing, storing, managing, and disseminating on-demand information to the warfighter. This environment compels a shift from system-to-system to system-to-service exchange to enable on-demand discovery of and access to all available information resources. As the GIG evolves toward a net-centric architecture, interoperability testing must also evolve. Increasingly, the requirement will be to test a system's ability to successfully discover and employ the appropriate information resources within the context of the GIG.

Net-Ready Key Performance Parameter

The main component of this new approach to interoperability testing is the Net-Ready Key Performance Parameter. The NR-KPP consists of measurable, testable, or calculable characteristics and/or performance metrics required for the timely, accurate, and complete exchange and use of information. It defines the performance attributes and creates the framework for identifying the information structure necessary to enable the functional capabilities identified in the requirements documents. The NR-KPP consists of the following five elements:

- Compliance with solution architectures
- Compliance with net-centric data and services strategies
- Compliance with applicable GIG technical guidance
- Compliance with DoD information assurance requirements
- Compliance with supportability requirements, including spectrum use and information bandwidth requirements.

A compliant solution architecture is being developed in accordance with the current version of the DoD Architecture Framework as guided by the laws, regulations, and policies defined in the rules and constraints of the DoD Information Enterprise reference, DoD Directive 8000.01. Compliant solution architecture descriptions assist DoD in understanding the linkages between capabilities and systems. Architecture products, or models, are grouped into eight viewpoints, or modeling perspectives—all, capability, data and information, operational, project, services, standards, and systems viewpoints—that logically combine to describe a program's architecture. The architecture is integrated when the data elements defined in one model are the same as architecture data elements referenced in another model. Each model within the eight viewpoints depicts certain architecture attributes. Some attributes bridge views together and provide integrity, coherence, and consistency to architecture descriptions.

Net-Centric Data and Services Strategy Compliance

Compliance with the net-centric data and services strategy is an essential prerequisite of net-centric operations.

In order for a capability with net-centric requirements to gain joint interoperability certification, program data and services must be exposed by making those data elements and services visible, accessible, and understandable to potential authorized consumers anywhere on the GIG. JCIDS requirements must document compliance with the DoD net-centric data strategy and DoD net-centric services strategy. Tactical systems, control systems, and weapons systems with time-critical constraints are exempted from the requirement to demonstrate compliance with the data strategy. The ultimate goal is that all elements of DoD are networked and able to share information. The result will be a dramatic improvement in operational effectiveness.

GIG Technical Guidance

GIG technical guidance is an evolving Web-enabled capability providing the technical guidance necessary for an interoperable and supportable GIG built on net-centric principles. GIG technical guidance provides a one-stop, authoritative, configuration-managed source of technical compliance guidance that synchronizes previously separate efforts. The GIG technical guidance aids program managers, portfolio managers, engineers, and others in determining where an IT or NSS fits into the GIG with regards to end-to-end technical performance, access to data and services, and interoperability. GIG technical guidance is also essential for ensuring technical interoperability of IT and NSS on the GIG.

Information Assurance

All IT and NSS must comply with applicable DoD information assurance policies and instructions. Information assurance is an integral part of net-readiness. DoD employs a defense in-depth strategy to establish and maintain an acceptable information assurance posture across the GIG. All GIG information systems shall implement information assurance elements and protection mechanisms that protect and defend information and information systems by ensuring their availability, integrity, authentication, confidentiality, and non-repudiation. Program managers must ensure that information assurance is fully integrated into all phases of their acquisition and upgrade, including initial design, development, testing, fielding, and operations.

Electromagnetic Environmental Effects

All IT and NSS systems must comply with electromagnetic environmental effects control and spectrum supportability policy. The spectrum supportability process includes national, international, and DoD policies and procedures for the management and use of the electromagnetic spectrum. All IT and NSS systems must be mutually compatible with other systems in their electromagnetic environment and not be degraded below operational performance requirements due to electromagnetic environmental effects.

All capability development documents, capability production documents, information support plans, and tailored informa-

tion support plans for systems that exchange information with external systems will be reviewed and certified based on adherence to NR-KPP criteria. In turn, JITC will use the NR-KPP thresholds and objectives to ensure that all system information exchange requirements have been satisfied during all applicable test events. These test events must be conducted in an operationally realistic environment. That includes employing production representative systems, members of the user community as operators, and realistic messages and network loads.

Performing the Interoperability Evaluation

Interoperability evaluation often spans developmental test and operational test and evaluation, and it relies on multiple test events conducted by various organizations. The amount and type of testing will vary based on characteristics of the system being evaluated. A developmental test looks at how the system and its components meet the specifications to which that the contractor/vendor signed up to build. With the new acquisition strategies—such as spiral development—testers are involved earlier. That helps JITC collect information and data to reduce risk and time required for interoperability certification and operational testing or assessments. Verification of conformance to standards is one of the first steps in the interoperability testing process. As IT and NSS systems are designed, the developer is required to implement standards or products contained within the DoD IT Standards Registry. Early on in the development/acquisition cycle the particular IT and NSS (or components of that system) is tested to ensure the chosen standards are properly implemented. Conformance with DoD IT Standards Registry standards does not guarantee interoperability, but it is an important step toward achieving it. Developmental testing performed under government supervision that generates reliable, valid data can be used to determine technical capabilities and standards conformance status, and may supplement operational data for an interoperability evaluation.

Throughout the acquisition cycle, JITC will use any valid data from developmental test, operational test and evaluation, demonstrations, field exercises, or other reliable sources for interoperability evaluations. Complex systems involving

Compliance with the net-centric data and services strategy is an essential prerequisite of net-centric operations.

multiple evaluation events may require JITC to develop an interoperability certification and evaluation plan, which outlines how the system will be tested against approved requirements. Each potential data collection opportunity should be used in the overall certification process to get the best interoperability picture of the system in the most efficient manner possible.

Reporting Interoperability Status

Certification is based on Joint Staff-certified capabilities and requirements, the criticality of the requirements, and the expected operational impact of any deficiencies. Certification is applied to the overall system if all critical interfaces have been properly implemented and tested. Interoperability status represents the extent of which a system is interoperable, with respect to the elements of the NR-KPP, information exchanges, and other defined interoperability requirements.

What will JITC Do to Get Your System Certified?

When contacted by a program manager early in the acquisition process, JITC will:

- Assist in identifying joint interoperability requirements during the concept development/design phase of the program
- Ensure that interoperability is built into the system from the start
- Plan for the most efficient use of resources
- Assist the program manager in identifying solutions to interoperability problems necessary to get the system certified.

Interoperability is a key enabler to combat effectiveness.

JITC also has a range of tools available for system assessments and laboratory resources for testing virtually all types of IT and NSS systems.

What Will Happen if a Program Manager Fails to Participate in the Joint Interoperability Certification Process?

The answer to this question comes straight from CJCSI 6212.01:

4. Failure to meet Certification Requirements

a. If a program/system fails to meet or maintain I&S Certification and/or Joint Interoperability Test Certification requirements, the J-6 will:

(1) Withhold certification or revoke any existing Interim Certificate to Operate (ICTO) until the outstanding issue is corrected.

(a) Recommend the program not proceed to the next milestone (if currently in the DoD 5000 acquisition process).

(b) Recommend that appropriate funding be withheld until compliance is achieved.

(2) Make its recommendation to the USD(AT&L), USD(P), USD(C), USD(I), ASD(NII)/DoD CIO, DoD EA for Space, the MCEB, and the Joint Requirements Oversight Council (JROC). The J-6 may also request that the program and/or system be added to the MCEB ITP's Interoperability Test Watch List (ITWL).

Of course, real-world capability development and testing are rarely simple, and DoD has provided several mechanisms for identifying and seeking solutions to current or foreseen interoperability problems. DoD policy clearly states that all IT and NSS systems, regardless of acquisition category, must be tested and certified for interoperability before fielding. The Military Communications Electronics Board Interoperability Test Panel (ITP) identifies, coordinates, and resolves IT and NSS interoperability policy and testing issues to ensure compliance with DoD policy regarding interoperability of IT and NSS during the requirements validation process and throughout the acquisition life cycle.

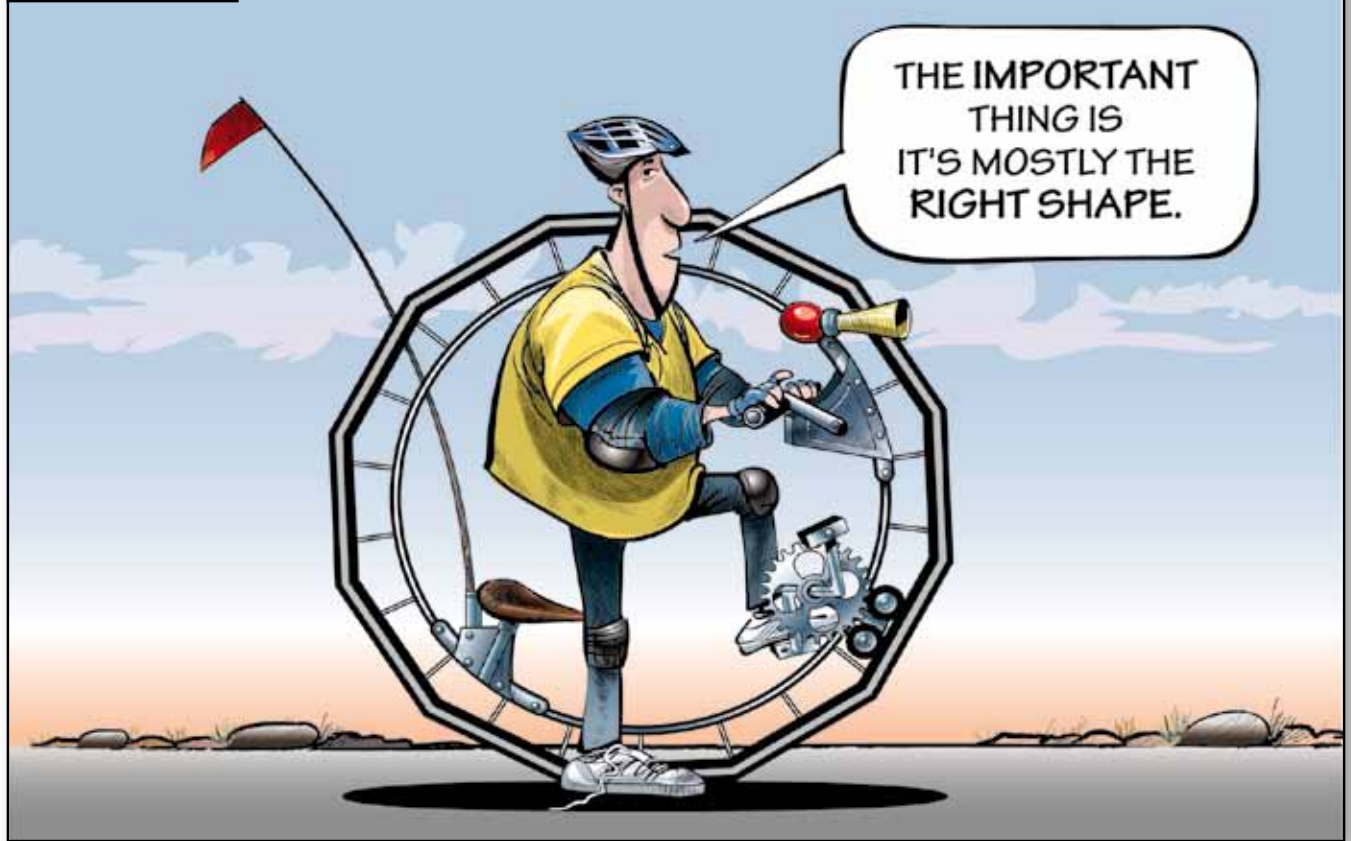
To further assist in monitoring compliance with DoD policy regarding interoperability certification, the ITP provides semi-annual interoperability status briefings to the Military Communications Electronics Board. The briefings typically provide the overall interoperability status of a functional area or family or system of systems to the Military Communications Electronics Board, identifying capabilities that may require additional attention or assistance to achieve full interoperability. When necessary, the ITP may nominate programs for inclusion on the interoperability watch list. Criteria for nominating programs

to the watch list include, but are not limited to, the following:

- No plans for joint interoperability certification testing
- Failed joint interoperability certification tests and no plans for addressing identified deficiencies
- Lack of JCIDS or test documentation for defense technology projects and pre-acquisition demonstrations
- Known interoperability deficiencies observed during operational exercises or real-world contingencies
- Non-compliance with approved integrated architectures.

Once placed on the interoperability watch list, it is the program manager's responsibility to take corrective action to address interoperability deficiencies and report progress to the principals represented on the Interoperability Senior Review Panel. If interoperability issues are not adequately addressed, or if deficiencies persist, the program or system may be recommended for transfer to the OSD T&E Oversight List.

In certain cases, the ITP may grant an interim certificate to operate that may not exceed one year. The ICTO provides the authority to field new systems or capabilities for a limited



time, with a limited number of platforms, to support development efforts, demonstrations, exercises, or operational events without an interoperability test certification. It is the program manager's responsibility to submit the ICTO request. As the ITP executive agent, JITC provides recommendations to the ITP for or against the ICTO based on available interoperability data and an evaluation of the possible risk to the user and other connected systems. After reviewing the program manager's justification statements and JITC's recommendations, the ITP will then vote to approve or disapprove the request.

JITC issues special interoperability test certifications for systems or system components (e.g., network infrastructure components, voice/video/data components) that require interoperability test certification but are not subject to the JCIDS process. Requirements for these types of system components are derived from the unified capabilities requirements. Products that undergo successful testing and meet specified requirements defined within the unified capabilities requirements are placed on the unified capabilities approved products list.

Many legacy-fielded systems lack both interoperability testing and current requirements documentation. Programs scheduled to terminate may not require interoperability testing and certification and may request a legacy waiver if they meet certain criteria. Waivers under this option may

be applied to versions, increments, blocks, etc. Program managers responsible for systems maintaining a continued GIG connection that will not require updated requirements documentation recertification and examination to maintain that connection to the GIG may also request a legacy waiver if specified criteria are met. Waivers under this option cannot be applied to versions, increments, blocks, etc.

Systems that possess no joint interfaces and no information exchanges (whether in development or already fielded) may be candidates for a joint interoperability testing exemption. A request for an exemption must be forwarded to the appropriate Military Communications Electronics Board ITP representative, and the Joint Staff, J-6 will either concur or not concur with the request typically within 30 calendar days of receipt.

Assurance of Interoperability for the Warfighter

Unquestionably, interoperability is a key enabler to combat effectiveness. JITC will continue to play an active role in the joint interoperability test and certification process. This proven process affords higher levels of assurance that warfighting systems will interoperate properly so that the battleground does not become the testing ground.

The author welcomes comments and questions and can be contacted at chris.watson@disa.mil.



Don't Waste Your Time

Wayne Turk

At one point in my Air Force career, I worked for a colonel who had his own ideas on time management. We were working a highly stressful, long-term, high-cost, extremely visible project; and we were frequently swamped. There were not enough hours in the day to get everything done. I should also point out that this was in the days before e-mail became prevalent as a means of communication, which would have made the situation even worse. One method the colonel used to cut down on his workload was ignoring everything (memos, requests, data calls, etc.) the first time they came in—unless it was from a general officer, that is. If the item came back again, it got added to the to-do pile (unless the colonel deemed it still unnecessary or worthless).

Turk is an independent management consultant. He is a retired Air Force lieutenant colonel and defense contractor and the author of *Common Sense Project Management* (ASQ Press). He is a frequent contributor to *Defense AT&L*.

While I don't recommend the colonel's tactic, I was shocked at how many of the requests, data calls, and the like never came back. While someone at some time thought that the item was important, most were just time wasters on somebody's to-do list. In a similar vein, during a consulting assignment, I discovered that many of the recurring reports (weekly, monthly, quarterly, and annual) that had to be produced by different parts of the organization I was helping were never read nor were the data ever used; they were just skimmed or filed away. They had been initiated at times when the information was important to some level of management but were never cancelled, even when no one was reviewing them. Those are true time wasters for too many people. Look into and question whether the reports or tasks you are required to do have any real use. If they are not useful, say so.

There are many, many other time wasters that managers face:

- Massive numbers of e-mails, many of which are unimportant and/or not related to your job (jokes, warnings, or personal missives)
- Meetings (some of which are very important but most of which are a waste of your time)
- Drop-in visitors (not all are time wasters, though!)
- Doing the work of others
- Doing tasks that could be delegated
- Urgent but actually unimportant tasks.

You know some of what wastes your time, but there are probably other things that you haven't thought about. This article won't really focus on what wastes your time; it will provide suggestions on how to more efficiently use the time that you have. After all, you can only manage *your* time. These suggestions come from a number of sources collected over time and have become generally accepted guidelines.

Create a Time Log

Some experts suggest that before you begin to make changes in how you manage your time, you need to track how your time is actually spent. That involves keeping notes for a suitable period (say a week). Create a simple table, make six copies, and carry a copy with you each day, filling in a row every time you change activities. Try to put in everything. If you talk to Joe for 10 minutes, answer e-mails for five minutes, review a report for 20 minutes, and attend a 30-minute meeting with a 5-minute conversation with Kim after the meeting, they all go in the table. I know that's a pain, but it can pay dividends by giving you a good idea of how you spend your time during the workday. You may be surprised. It also will make you more cognizant of some of your wasted time or non-useful activities.

There are various types of wasted time. Probably the most common are your social interactions, such as telephone calls, people stopping by the office just to shoot the breeze, and conversations in the hall or break room. Don't even consider trying to eliminate *all* of your non-work related activities—we

all need breaks to recharge, and hallway conversations can help you in networking or the building stronger relationships with your employees. However, if it's a choice between talking with a friend and meeting a deadline, you really should have no choice. A time log will show you if this is a problem for you.

As you review each activity in your time log, decide how much time each was worth to you and compare that with the time you actually spent. An afternoon spent rewriting a report that no one will read, a meeting at which you gave no input and got nothing out of, or reading a memo that applies only to another department all constitute an inefficient use of your valuable time.

Plan Your Day and Week

Sure, unexpected things are going to come up, but if you start with a plan on how to allocate your time, you are much better off. Put it on your calendar. Block out time for what is important. Put as much on your schedule as is reasonable, but always leave some open time. You will probably need it when something on the calendar slips, you want a last-minute meeting with someone, or a crisis arises. Putting things on your calendar will also help you organize your time in a more meaningful and useful way.

While you are planning, think about your most productive time of the day. For some people it is first thing in the morning. For others it is later. Block out that time on your calendar and plan to get as much done as possible then. You should, if possible, disconnect yourself during that time. By that, I mean try turning off (or at least ignoring) your cell phone, Blackberry, and computer for an hour or two. It may be tough for Blackberry addicts to go cold turkey, but it can be done.

Make a To-Do List.

Create an ongoing to-do list and update it daily. You can make it electronic, handwrite it, or put it on a whiteboard. Some people like writing their list by hand because it shows commitment to each item, particularly if they rewrite it each day until it gets done. Other people like software that can slice and dice their to-do list into manageable, relevant chunks. Before I retired, I kept mine on the whiteboard on the wall in front of my desk. That way, I saw it every time I looked up. Wherever you keep it, mark off or erase things as you complete them. This gives you a sense of accomplishment.

Though it may sound tedious, keeping a to-do list along with your schedule, noting people that you need to talk to, and even jotting down important thoughts can keep your head clear so you are more in the moment during the day and more capable of handling situations that need quick thinking and problem-solving skills. Lists and schedules also keep you organized so you don't waste time trying to figure out where you are supposed to be, who you are supposed to meet, and what is important to get done. They also help to keep you from missing important things.

Don't forget to put some of your long-term activities or requirements on your to-do list; otherwise, they have a tendency to be forgotten or put off until the last minute.

Prioritize

Prioritize and do it ruthlessly. Some experts say that you should start each day with a short session prioritizing the tasks for that day. Others say to do it for the next day in the evening before going home so that you can start the next day immediately upon arriving. Look at your list realistically. How many items do you truly need to accomplish? Which are the most important? Which can be delayed or delegated? What is due or soon to be due? You can mark the things on your list by colors or numbers to identify which items are important and need to be accomplished ASAP, which are important but can be delayed, and which can be done when you find time.

Break the larger tasks into smaller chunks. That makes it easier to get started, and once you get started, it is easier to complete the task.

Determine urgent versus important tasks. There can be a difference between urgent tasks and important tasks. Admittedly, sometimes they are the same, but frequently, the urgent tasks are time critical and not always that important. Priorities should be by importance. Yes, get the urgent ones done, but only spend the appropriate amount of time based on their importance.

Batch Tasks

Often, people waste time changing between activities. For that reason, it is useful to group similar tasks together to avoid the start-up delay of each. If there are multiple things to be done out of the office, try to group them together. It is like when you are running errands on the weekend: You want to stop by the drugstore, the supermarket, the bank, and the dry cleaners all in one trip to save time and gas.

You can also batch your e-mail time. It's not an effective use of time to read and answer every e-mail as it arrives. Don't let it interrupt you when you are doing something else. Just because someone can contact you immediately does not mean you have to respond immediately. As long as people know you will answer and they know how to reach you in an emergency, you can answer most types of e-mail just a few times a day. Turn off the e-mail notification signal on your computer if you have one. That will help you ignore e-mails until you are ready to attack a number of them.

**"Time stays long enough for
anyone who will use it."
Leonardo Da Vinci**

Identify and Eliminate Self-Interruptions

Too many times, you interrupt yourself. You're sitting at your desk working on a task when suddenly you think of something that you need to do or something that you need to talk to someone about. So you immediately start on the new task or you pick up the phone or dash off an e-mail to take care of whatever you were thinking about before you forget. Instead of interrupting yourself, just make a note of it and go back to what you were doing. You can come back to it later.

You can also get a three-ring binder, some loose-leaf paper, and A-Z tabs. Label a sheet for each person with whom you communicate frequently and add one for "others." When you think of something that you need to tell someone, note the thought or idea on the page for that person, and then go back to what you were doing. When that person's page has several thoughts or when you have a moment between tasks, call the person or send an e-mail.

Set Deadlines

By deadlines, I mean setting personal deadlines for the tasks that you have on your to-do list. Writing down the deadline makes it more real. If you set a deadline for yourself, keep it.

Sometimes you have deadlines or due dates set by other people. Set your own earlier deadline. For example, say the due date for personnel appraisals is Feb. 1. Rather than wait until they are due, set your own deadline to have the task complete by Jan. 15. That gives you time to look them over, and it gives you padding in case a crisis arrives and you can't work on the appraisals.

Once you have a deadline (self-imposed or otherwise), meet it. Don't let other tasks or people get in the way of that. Don't get sidelined by interruptions. If you're working on the last-minute details of a report for a meeting that starts in 30 minutes, don't accept a phone call or a drop-in visitor's request to talk to you for "just a minute."

Say No

Learn to say no. You can't do it all. You can't take on more when you already have a full schedule. Saying yes to every person that wants and needs something from you is *not* going to make you a better person or a better manager. It *will* set you up to be in a ceaseless losing battle to do your best at every task you agree to take on. Be realistic with your time and energy, prioritize what is truly important, and tell people no at times so you can put the right effort and the right time into everything that you do.

The suggestions in this article can all be helpful, and you should identify the ones that fit your style or preferences. Remember that your time is important. Find ways to use it effectively so that you can be efficient.

The author welcomes comments and questions and can be contacted at rwturk@aol.com.

Equity

Liberty

Security

Efficiency

Thinking in Fours

Christopher R. Paparone

Are you a manager who relies on linear thinking (i.e., systems engineering approaches like Lean and Six Sigma) to manage change in his or her organization? Or are you best described as a non-linear thinker—the alternative to linear, which calls for patterned thinking?

Paparone is an associate professor in the Army Command and General Staff College's Department of Logistics and Resource Operations.

Here is a quick way to test your preferences:. (Note: This information is derived from a study conducted by Charles Vance, Kevin Groves, Tongsun Paik, and Herb Kindler, published in the 2007 article in the Academy of Management Learning and Education journal, "Understanding and Measuring Linear—Nonlinear Thinking for Enhanced Management Education and Professional Practice")

Characteristics of Linear Thinkers

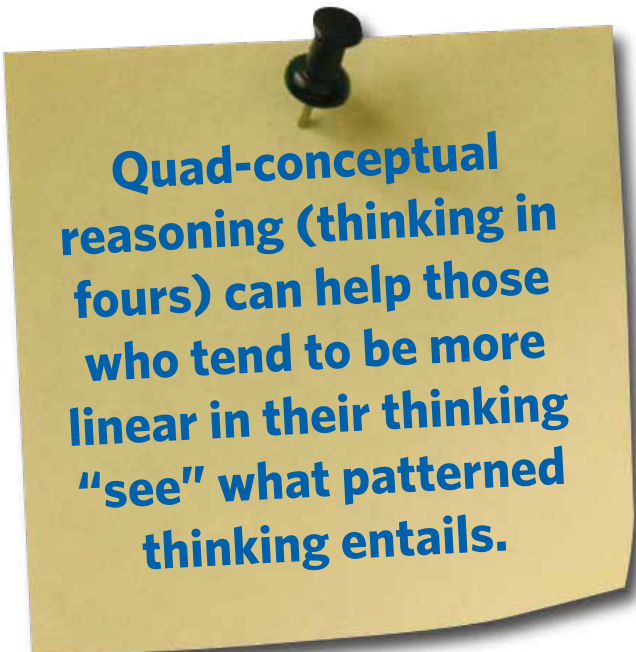
- I primarily rely on logic (if-then statements) when making decisions.
- I like using quantitative factors when making big decisions, such as return on investment, relative weights of decision criteria, and so on.
- When making important changes, I take note when multiple subject matter experts give me the same advice.
- The most important factor in making changes is to know that the decision is based on objective, verifiable facts.
- When my analysis and my intuition are in conflict, I go with analytical reasoning.

Characteristics of Pattern (Nonlinear) Thinkers

- I primarily rely on my feelings when making decisions.
- I like using qualitative factors when making decisions, such as my gut feelings or a sense that the decision is right.
- When making important changes, I pay close attention to "knowing in my bones," chills, tingling, or other physical sensations.
- The most important factor in making changes is that it feels right to me.
- When my analysis and intuition are in conflict, I give precedence to my intuitive insights.

The authors who posed these dichotomous characteristics argue that pattern thinkers are more effective when facing complex, turbulent, unpredictable, and uncertain situations than linear thinkers, who rely on analysis, logic, reason, and cause-effect predictability.

At the risk of sounding paradoxical (i.e., making intuitive processes more explicit), I have found one way of demonstrating patterned thinking—with the use of a four-square model. Quad-conceptual reasoning (thinking in fours) can help those who tend to be more linear in their thinking "see" what patterned thinking entails.



Quad-conceptual reasoning (thinking in fours) can help those who tend to be more linear in their thinking "see" what patterned thinking entails.

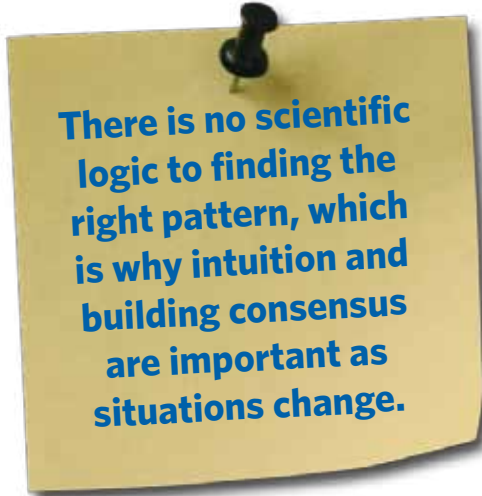
Four-Square Patterned Thinking

The basic patterned-thinking model is arranged in four squares, and the areas between and among the resulting quadrants depict the power struggles for dominance. Instead of ruling out alternative hypotheses and deciding on a course of action, four-square patterns call upon us to embrace contradictions as naturally occurring phenomena. Thinking simultaneously as you look at all four

squares takes us beyond linear (one best solution) thinking and makes it possible for us to make sense of today's complex world in a circular, interconnected, and interdependent way. Four squares give us a framework to see the complex, four-way, interdependent, and interactive nature of change management that take us beyond traditional linear processing associated, for example, with the traditional hierarchical and linear models of strategy→operations→tactics. In short, four squares help us visualize a more holistic approach to thinking about messy problems.

A Practical Example

Here is a practical example that should help you visualize the contradictions that are not so obvious in the more linear modes of thinking and modeling. In addressing policy and strategy for national defense, Pentagon and combatant command planners rightfully focus on security as the principal objective. All activities are geared to that objective, even to the point where planners believe other federal, state, and local agencies should be engaged in the same objective. The



There is no scientific logic to finding the right pattern, which is why intuition and building consensus are important as situations change.

goal of security seems daunting, and it reflects that linear thinking is still at work.

But what if a four-square model of thinking was used in planning national defense? Using the four competing goals described by Debora Stone in her book *Policy Paradox*, a four-square model of thinking can be formed that has the goals of:

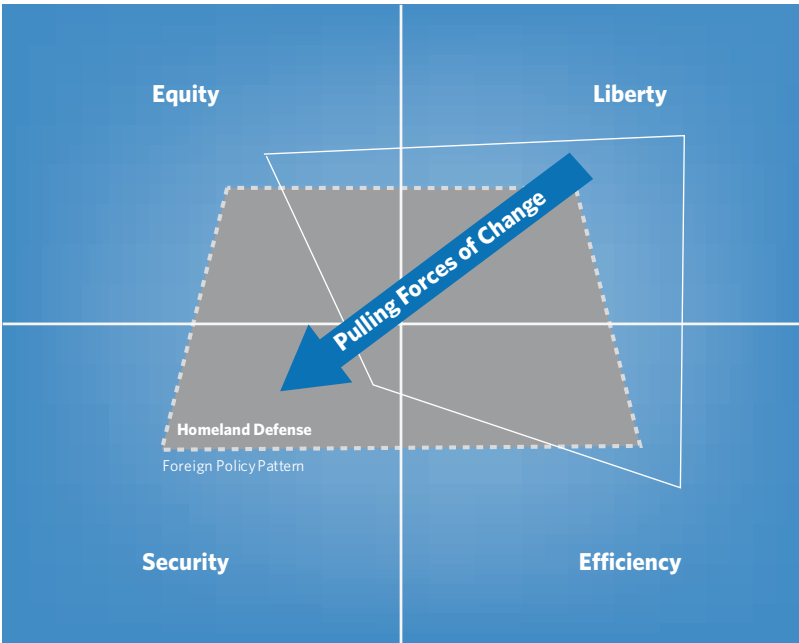


Figure 1. The Pattern of Competing Goals

- **Equity**—Redistribution of value that fuels debate between domestic and defense spending, for example.
- **Liberty**—Autonomous freedom that ideally leads to political consensus on limits imposed by the other three goals.
- **Efficiency**—A comparative concept of most output for the input, associated with a free market economy.
- **Security**—What is needed for physical protection and survival.

But how does the four-square model relate to patterned thinking? Applying the four-square model of thinking to the post-Sept. 11, 2001, world (see Figure 1), you can see how the terrorist attacks influenced the domestic goal patterns sharply from the A-B horizontal axis to the C-D axis—with the growing perceived tradeoffs, especially in efficiency and liberty. “Seeing the pattern” (and pattern-shifts over time) tells us that it is important we think beyond the singular goal of protecting ourselves, and that we must not cause damage to the other goals in the process (to include checks and balances, democratic processes, human rights, freedom, meritocracy, open markets, ethics-based institutions, etc.) in the name of security. The pattern does not show a linear decision model of foreign or domestic policy options, but, rather, shows an interactive web of tradeoffs that will shift as conditions change.

But let us not stop there. Figure 2 demonstrates that if we go too little or too far in any one direction, we may end up with an imbalanced state of affairs. Going too far with equity can result in unproductive socialism (with free ridership, public apathy, and chaotic governance); too much liberty can be anarchic (with lawlessness, public belligerence, and chaotic governance); too much emphasis on efficiency can encourage greed and concentration of wealth (monopolies with justifiable labor hostility and rigid, partial governance); and, finally, resourcing security may also create too much bureaucracy (with more red tape and the potential stifling of innovation).

Practical Application

How can a manager apply these sorts of patterns in their day-to-day operations and to future planning efforts? Here’s where creative thinking can complement patterned thinking. Develop lists of goals that are important to your organization and place them against opposing goals that, in some cases, might also be valuable. Set up the four-square model and draw the patterns you perceive operating now and the ones you would like to change. For example, here is a list of competing goals that might help you get started (taken from Kim Cameron’s and Robert Quinn’s book *Diagnosing and Changing Organizational Culture*):

- I’d like my organization to be more of a personal place, like an extended family, where we share a lot more of ourselves.
- This place should be more dynamic and entrepreneurial, where people are more willing to stick their necks out and take risks.

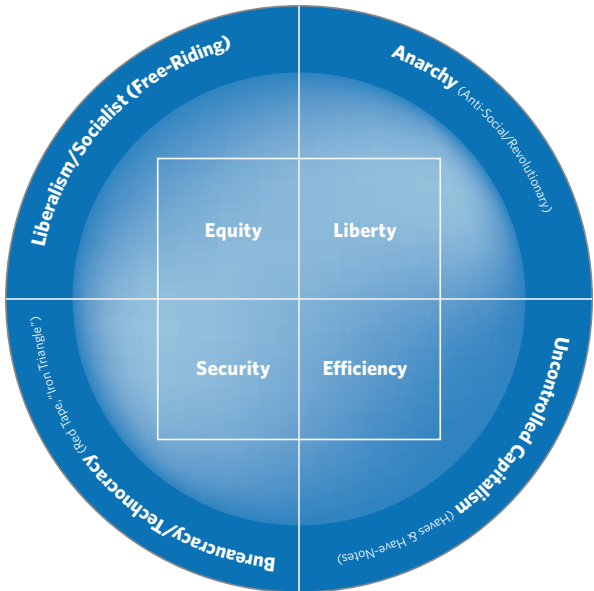


Figure 2. The Need for a Balanced Pattern

- We have to be more results-oriented and more concerned with getting the job done—ultimately making our organization more competitive and achievement-oriented.
- We have to improve the control and structure in this place, tightening up our formal procedures that should govern what our workforce does.

Using a 100-point scale, distribute the points into the pattern (Figure 3). This should help you intuit the complexity of the goal setting you are undertaking and help you assess balance among competing concepts. Try having others do the same and then compare patterns—perhaps now acknowledging

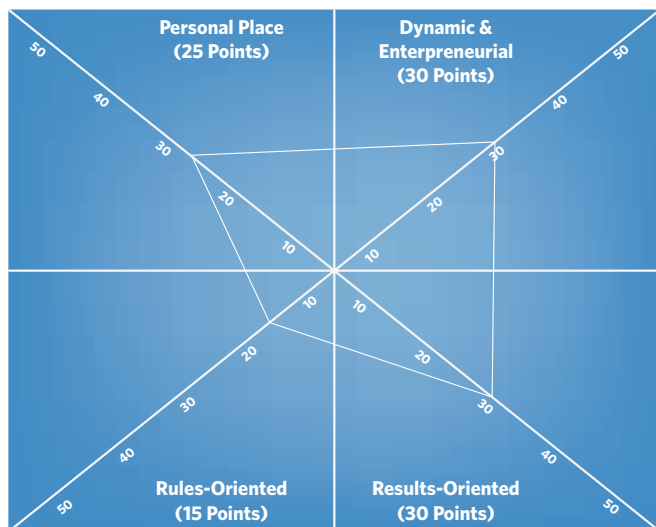


Figure 3. Judgment of Situational Balance

that others have differing views when faced with the paradox of competing values.

Brain researchers such as Ned Herrmann (author of the *Whole Brain Business Book*) claim that patterned thinking in most humans is limited to four competing concepts at a time. There are other studies that also indicate the human brain may at best be quadrifrontic (four-way looking [as outlined in Robert Quinn's and Kim Cameron's book *Paradox and Transformation*]), so I would not recommend exceeding the two-dimensional four-square approach—at least while getting used to the idea of patterned thinking.

The trick is to intuit about the right pattern that will make your organization more effective. There is no scientific logic to finding the right pattern, which is why intuition and building consensus are important as situations change. As organizations attempt to adapt appropriately to prevailing conditions, thinking in fours may help.

The author welcomes comments and questions and can be contacted at christopher.paparone@us.army.mil.

Need for Balance

I read Jaime Gracia's article "Questioning Uncle Sam" in the September-October 2009 issue of *Defense AT&L* magazine. I thought the article made quite a few good observations and recommendations, but at the same time, I felt a little short-changed by the article.

I have no illusions that the acquisition system doesn't need some fixing, but any complex system does. Gracia only provided two glaring examples (Alliant and KC-X) in condemning the whole acquisition system and its leaders (generally), while at the same time saying that some "companies are using protests as a strategic weapon to ensure they remain viable."

The author made many good points, but I feel the article could have been more balanced by showing that of the 1,600 protests filed in 2008, what percentage of them were actually sustained.

E. Sanchez

ACC Acquisition Management
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Addressing EVM

I had concerns with the scenarios and with other parts of an article that appeared in the September-October 2009 issue of *Defense AT&L*, "Advancing EVM and Government Contracting Efficiencies," written by Daniel A. Zosh.

The article states, "In a typical DoD weapons system procurement, much of the cost of the system is expended during research and development and, therefore, there's a large amount of profit consideration given to the contractors' developing systems that exist only on paper as technical specifications." This depends on how one defines "much of the cost of the system." For most system programs, the amount for research and development is somewhere around 20 percent or less, while operations and support costs may exceed 50 percent.

What is clearly true is that decisions made early in a program's development, before much of the life cycle cost has been expended, commit the government to expenditures throughout the total life of the system.

The article states, "On a \$1 billion contract with an 8 percent negotiated fee, the contractor profits \$80 million. If the contract grows (via amendments) to \$1.5 billion, the contractor profits \$120 million. Therefore, the contractor has an underlying motivation to grow the value of the contract with additional scope of work."

Although the total amount of profit or fee may relate to the size of a contract, the profit margin is not. According to FAR 15.404-4, profit "prescribes policies for establishing the profit or fee portion of the Government prenegotiation objective in price negotiations based on cost analysis." FAR 15.404-4 (d) Profit-analysis factors— establishes the factors to be considered. Size of the contract is not listed among them.

I suspect that for many, or even most, acquisition personnel, the article's first scenario is confusing because the calculation appears to be based on the government's share of the underrun, not the contractor's. As presented, the fee calculation is incorrect, as it mistakes the government's share for the contractor's share.

The Federal Acquisition Regulation clauses at FAR 52.216-10 Incentive Fee, FAR 52.216-16 Incentive Price Revision—Firm Target, and FAR 52.216-17 Incentive Price Revision—Successive Targets, do not provide for share ratios, but only how the profit or fee will be adjusted as a result of performance against the target cost, not "base value" as described in the article.

In the second scenario, it should be noted that contractors do not add modifications to contracts. Modifications, including changes within the general scope of the contract, are directed by the government.

A contractor does not reduce overhead rates for a single contract, but for all work in that pool. If there was only one contract, those would all be direct costs to the contract. However, one would certainly hope that the principal administrative contracting officer, corporate administrative contracting officer, or Defense Contract Audit Agency would be monitoring any changes in the contractor's indirect cost bases and be requesting a renegotiation of forward pricing rate agreements. Hopefully, all three would be doing so. This also confuses actual

overhead costs with absorption, while presuming that all overhead costs are fixed, and that none are variable or semi-variable.

Scenario 3 describes a contract structure that appears to be precluded by the Federal Acquisition Regulation because it has eliminated the adjustments to fee, essentially converting the contract to a cost-plus-fixed-fee contract. However, that change removes the cost incentive (or constraint) required by FAR 16.402-1 Cost incentives.

Regarding motivation for contractors, there are a number of motivations, including selling greater quantities over a longer period of time. In some cases, just to avoid program cancellation or a shift to lower cost alternatives. This affects the ability to compete for foreign military sales in the world market, which is fairly typical for U.S. systems over time. It also has an impact on how the contractor's past performance is evaluated. All of this becomes important to the original equipment manufacturer as they are looking to capture more business later, particularly support in the operation and maintenance phase after fielding.

John Krieger
Defense Acquisition University

The Author Responds

Thank you for your comments. It is good to see the article is encouraging some feedback and discussion. Please make sure you and your associates do not miss the true intent of the article: to promote thoughts and actions to change the way government DoD contracts are structured. The article will hopefully help stem the historical practices that lead to cost overruns and schedule delays on many government research and development type contracts. If the government can incentivize properly with millions of dollars, billions can be saved, and delivery of weapon systems can occur in a more timely manner. In addition, this article disregards operational cost assessments, and the intent is to address the research and development cost overruns and controlling the volume of contract modifications where the original baseline is lost over time. This is where dollars and time can be saved if contracts could be structured more appropriately.

Daniel Zosh
Project Management Consultant

Around the Acquisition Community

A brief compilation of major acquisition news items, career development announcements, Defense Acquisition University initiatives, and leadership changes.

For more acquisition news, please go to the Defense AT&L magazine Web site at <<http://www.dau.mil/pubscats/pages/defenseatl.aspx>> and click the links under the "Acquisition News Topics" heading.

The Future of Acquisition Reform

Requirements Gathering, Flexible Systems Key to Future Engagement

Noreen Costello and Carol Scheina

Dr. Ashton Carter, under secretary of defense for acquisition, technology and logistics, recognizes the urgency of ensuring the Department of Defense's acquisition workforce are able to respond to current warfighting challenges and are prepared for the future.

"When Secretary [of Defense Robert] Gates offered me this job, he said the troops are at war and the building is not," Carter said, speaking at the PEO/SYSCOM Commander's Conference, held Nov. 3 to 4, 2009, at the Fort Belvoir Officer's Club, Va. "Reshaping Defense Acquisition for 21st Century Customers" was this year's conference theme, and the 450 conference attendees participated in and listened to panels, workshops, forums, and roundtable discussions to gain a better idea of how to ensure DoD is shaped for the future. Carter and Chairman of the Joint Chiefs of Staff Navy Adm. Mike Mullen were the keynote speakers for the event.

Key Areas of Improvement

During his speech on Nov. 3, Carter identified three key areas that DoD acquisitions must focus upon in terms of improvement. First, DoD needs to provide more rapid and responsive acquisition. We need to review our processes, and if we're called to do so, we're going to build something quickly, he emphasized. Second, DoD needs to overcome its logistics challenges, particularly as it focuses on increasing operations in Afghanistan. The location is "the most difficult place to fight an expeditionary war," Carter said. Operations in Afghanistan often involve locations that are far removed from any base of operations, across barren and rocky terrain that is difficult to cross.

Third, DoD needs to strengthen its contingency contracting efforts. "We have to get good at contingency contracting; it's something we're still working on," Carter said. DoD should not repeat in Afghanistan the mistakes that were made in Iraq, he emphasized. Two major problems faced in Iraq were maintaining the level of necessary contract support needed for effective operations, and avoiding contracting practices that could lead to audits and protests. "We need to maintain a balance between controls on one hand and effectiveness on the other," he said.

Weapons Systems Acquisition Reform

DoD acquisitions need to change to support current operations. Gates has emphasized that we need to keep scrutinizing the way we do business, Carter said, and the secretary of defense has taken an intense interest in acquisitions, making it one of his top priorities. The president and Congress also take note of what goes on in the acquisition world, as acquisitions involve both taxpayers' money and the ability of our nation to defend itself and conduct effective military operations. Congress voted for acquisition reform in the Weapons Systems Acquisition Reform Act (WSARA), and the president signed the act into law on May 22, 2009.

Much of the WSARA of 2009 emphasizes changes to the acquisition process identified in DoD Instruction 5000.02, which was the first major overhaul to the acquisition process in five years. A major part of the act involves the creation of the presidentially appointed director of cost assessment and



Dr. Ashton Carter, under secretary of defense for acquisition, technology and logistics, speaks at the PEO/SYSCOM Conference Nov. 3. Photo by Scott Henrichsen

program evaluation, who will provide independent cost assessments of some, but not all, of DoD's major acquisitions programs. The act will help DoD pay attention to time and affordability and develop realistic cost estimates, Carter said.

"We need to do better development of things," Carter said, and that's another major focus of WSARA. The act emphasizes better developmental planning and stronger systems engineering.

"We need to have the discipline to stop things that aren't working; to emphasize performance above all," Carter said.

The Focus on People

Above all, though, Carter said that there needs to be a strong workforce. "The big key to acquisition reform: people. We can do this process; that process. But it makes a difference if you don't have good people," Carter said. "This is a big priority."

Gates has called for 20,000 additional acquisition new positions—10,000 in-sourced (contractors converted to government employees) and 10,000 new government positions—by 2015. Carter said DoD will meet that goal, but emphasized that while quantitative targets are important, it is quality that matters most. "We need to attract to the acquisition workforce more and highly skilled people," Carter said. "When we talk about acquisition reform, if we don't talk about people, we're wasting our time," he added.

Strategizing the Future

Mullen spoke at the conference a few hours after Carter, and he emphasized the importance of responsible requirements gathering and the acquisition of flexible systems, particularly when faced with the reality that we can no longer predict DoD's next military engagement. Mullen gave a broad overview of the challenges the department faces in providing support to the 21st century warfighter.

"We have not done a good job of predicting what comes next," he admitted, saying that while we have been able to sustain in Iraq and Afghanistan since 2001, there is still progress to be made. Using the wars in Iraq and Afghanistan as a point of reference, Mullen explained that the traditional Washington mentality of focusing on the five-year horizon is no longer adequate. "My day starts with what's going on in the war. What's going on in the wars now has a lot to do with what's going on in the future," he said, stressing the importance of recognizing the evolving threat.

The department has to try to "move the pendulum" toward a strategic frame of mind to better anticipate the future if

we're going to ensure the warfighter at the edge has what he or she needs, he explained. "We just need to move it a little," he said, "not swing it entirely."

Some of the challenges Mullen has faced in his attempt to move the pendulum include finding better ways to do requirements gathering, recognizing and addressing faults in the acquisition process, and dealing with budgetary constraints.

The Vision vs. the Requirement

Mullen pointed out that all of the combatant commanders are asking for more of the same things: intelligence, surveillance, and reconnaissance; missile defense; preventative engagement groups in country; and ways to address cultural and language barriers in the area of responsibility. The problem, as Mullen explained, is moving these requirements through the acquisition process. That's something that became very clear to him during his time as the Chief of Naval Operations.

"There's a great deal of disconnect between the vision or requirement that I, as a CNO, had and the end acquisition," said Mullen. What happens, he explained, is that "they guy with the original requirement—the guy with the vision" gets the contractor to buy into that vision and translate it into a proposal. The acquisition representative then handles the proposal and, ultimately, signs off on it.

"Along the line, people have 'great ideas' and add them in," said Mullen. "It's not that the ideas that get added in aren't good ones; it's just that they're not what was being asked for. A lot gets lost in translation." In addition, he said, great ideas can be expensive.

As a result of the current acquisition process, there's a disconnect between the information in the contract compared to the original requirement. "What is actually in the contract?" Mullen asked, directing the question to the acquisition community at large. "I want you to read it back to me [*the individual who generated the requirement*] before you sign it."

"[*The process*] has got to be transparent. It's got to be collaborative. It's got to be everyone in the room working together and making hard decisions," said Mullen.

Need for Flexibility

There are plenty of things that can be done to meet warfighter needs within the existing acquisition system, though. The most important thing we can do, said Mullen, is to acquire flexible systems. "We can't hold out for the exquisite,



Chairman of the Joint Chiefs of Staff Navy Adm. Mike Mullen discusses the need for a 75 or 80 percent solution now rather than a perfect system in the future. Photo by Scott Henrichsen

golden, one-of-a-kind solution." In being unable to predict what comes next, "having robust enough, flexible enough systems is going to be key." He added that oftentimes, it takes us too long in developing a system to figure out what we are trying to do. The two best methods to avoid running into that problem are a thorough approach to the requirements gathering process and a component-based, flexible acquisition process.

"Some of the best systems we have built have been a combination or integration of the minimally capable components," he said. The 75 or 80 percent solution can often meet warfighter needs more quickly than holding out for a 100 percent solution.

"We need to be realistic about what we can actually afford right now. ... If someone's got a better idea, just remember that better ideas are really expensive sometimes," Mullen said.

Control the Budget

Mullen continued to speak about budget constraints, citing that while there are always tight budgets, history has demonstrated it's a cyclical process. "In growing budgets,

we've lost our analytical perspective. We've lost our prioritization," he said, and he indicated that there had also been a failure to train the new and younger members of the workforce to do the same.

"We don't reward getting it for less and turning the money back in," said Mullen, suggesting that acquisition reforms be put in place to create incentives for responsible spending.

Getting it Right

We don't know what we will face next, said Mullen, but we need to make sure our young captains, lieutenants, and sergeants have what they need when it happens. "These are the people who have learned so much in combat," he said, "They are crucial to our future."

The acquisition community carries a lot of responsibility in serving the 21st century warfighter. We have to get the requirements right, we've got to get the process right while incorporating flexibility, and we've got to do it within the budget, Mullen said. "Fundamentally, I believe we've got to get it right for our people," he concluded.

Costello is a member of the Defense Information Systems Agency Corporate Communications Division. Scheina is managing editor of Defense AT&L magazine.

DoD Recognizes Excellence in Acquisition

On Nov. 3 and 4, 2009, Defense Acquisition Workforce members and organizations were recognized with acquisition awards in individual achievement, workforce development, and overall excellence in acquisitions. The awards were presented in conjunction with the Program Executive Officers'/Systems Command (PEO/SYSCOM) Commanders' Conference at Fort Belvoir, Va.

The Under Secretary of Defense For Acquisition, Technology and Logistics (USD[AT&L]) Workforce Achievement Awards were presented for the first time this year. The award was established as a result of the Weapon Systems Acquisition Reform Act of 2009 to encourage and recognize individuals who have demonstrated excellent performance in the acquisition of products and services for the Department of Defense. Recipients were judged based on their specific achievements within the functional area/category during fiscal year 2008 and the first half of the current year; the value of the nominee's contributions to the mission of the

organization and to the Department of Defense; and their leadership provided to others in their organization and toward achievement of organizational objectives. Winners were recognized in eight categories:

- **Program Management**
Johnnie Mize, U.S. Special Operations Command
- **Contracting and Procurement (including Industrial/Contract Property)**
Pamela Anderson, U.S. Air Force
- **Contract Audit**
Kathleen Stohs, U.S. Navy
- **Business, Cost Estimating, and Financial Management (including Earned Value Management)**
John Lilly, Missile Defense Agency
- **Management, Contract Oversight, and Quality Assurance**
Kent Schvaneveldt, Defense Contract Management Agency
- **Life Cycle Logistics**
Nick Smith, U.S. Navy
- **Systems Planning, Research, Development and Engineering (including Test and Evaluation, Production and Manufacturing)**
Joel Ankersen, U.S. Air Force
- **Acquisition in an Expeditionary Environment**
Bill Long, U.S. Air Force

The David Packard Excellence in Acquisition Award was established in 1997 to recognize organizations, groups, and teams who have demonstrated exemplary innovation using best acquisition practices to achieve excellence in DoD. It is the department's highest acquisition team award. Winners are recognized based on their ability to reduce life cycle cost and achieve best value for the government while balancing the benefits of the nation's socioeconomic policies with the cost of government-unique requirements on sellers; to make the acquisition system more efficient and responsive while managing risk and anticipating change; integrating defense with commercially available technology; promoting continuous process improvement of the acquisition process; and supporting USD(AT&L) goals and initiatives. This year's award winners are:

- Mine Resistant Ambush Protected All Terrain Vehicle (M-ATV) Source Selection Evaluation Board
- Project Manager-Mobile Electric Power
- PMS 408 Acquisition Management Team—Joint Counter Radio-Controlled Improvised Explosive Device Warfare
- 708th Armament Systems Group

The USD(AT&L) Workforce Development Award was established in 2004 to recognize organizations that are

achieving excellence in learning and development for their employees. A panel of judges from academia, industry, and corporate learning organizations independently conducted the awards evaluation process. The judges ranked each submission based on the workforce development program's objectives, best practices, and the benefits realized. The submitting organizations were also ranked on workforce development climate, training offered, academic affiliations and partnerships, and alignment of workforce initiatives with the organization's mission. This year's winners are:

Large Organization Category (500 or more employees)

- **Gold Award**
U.S. Army Armament Research, Development and Engineering Center, Picatinny Arsenal, N.J.
- **Silver Award**
Defense Information Systems Agency, Arlington, Va.
- **Bronze Award**
Air Force Global Logistics Support Center, Scott AFB, Ill.

Small Organization Category (fewer than 500 employees)

- **Gold Award**
Aviation Engineering Directorate, U.S. Army Aviation and Missile Research, Development and Engineering Center, Redstone Arsenal, Ala.
- **Silver Award**
Cost and Systems Analysis Office, U.S. Army TACOM Life Cycle Management Command, Warren, Mich.
- **Bronze Award**
Cooperative Threat Reduction Directorate, Defense Threat Reduction Agency, Fort Belvoir, Va.; and Detachment 1, Directorate of Contracting, Air Force Research Laboratory, Wright-Patterson AFB, Ohio





**DoD Acquisition
Best Practices Clearinghouse
(BPCh)**

<https://bpch.dau.mil>

DoD Acquisition Best Practices Clearinghouse (BPCh)

A single, authoritative source of useful, validated, actionable practice information

Do these issues sound familiar?

- There are many practice lists to choose from but no guidance for selecting specific practices
- “Proof of practice” effectiveness is usually not available
- The connection between practices and specific program risks are undefined
- Success factors for practices are not well documented
- Implementation guidance is often missing
- The cost and timeliness associated with implementing and using the practices are often not specified

The BPCh can help by:

- Serving as the authoritative source for practices in DoD and industry
- Targeting the needs of the software acquisition, software development, systems engineering, program management, and logistics communities
- Connecting communities of practice, centers of excellence, academic and industry sources and practitioners
- Promoting and assisting in the selection, adoption, and effective utilization of best practices and supporting evidence

For more information, visit the BPCh web site at <https://bpch.dau.mil>, or contact:

Mike Lambert
michael.lambert@dau.mil
703-805-4555

John Hickok
john.hickok@dau.mil
703-805-4640



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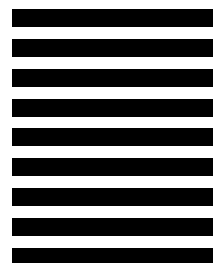
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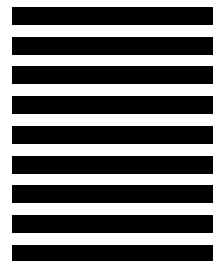
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Acquisition & Logistics Excellence

An Internet Listing Tailored to the Professional Acquisition Workforce

Surfing the Net



ACQuipedia

<https://acquipedia.dau.mil>

Online encyclopedia that provides the acquisition workforce with quick access to information on common acquisition topics.

Acquisition Central

<http://acquisition.gov>

Shared systems and tools to support the federal acquisition community and business partners.

Acquisition Community Connection

<http://acc.dau.mil>

Policies, procedures, tools, references, publications, Web links, and lessons learned for risk management, contracting, system engineering, TOC.

Aging Systems Sustainment and Enabling Technologies

<http://asset.okstate.edu>

Government-academic-industry partnership. ASSET program-developed technologies and processes expand the DoD supply base, reduce time and cost of parts procurement, enhance military readiness.

Air Force (Acquisition)

www.safaq.hq.af.mil

Policy; career development and training opportunities; reducing TOC; library; links.

Air Force Institute of Technology

www.afit.edu

Graduate degree programs and certificates in engineering and management; Civilian Institution; Center for Systems Engineering; Centers of Excellence; distance learning.

Air Force Materiel Command Contracting Laboratory's FARSite

<http://farsite.hill.af.mil>

FAR search tool; *Commerce Business Daily* announcements (CBDNet); *Federal Register*; electronic forms library.

Army Acquisition Support Center

<http://asc.army.mil>

News; policy; *Army AL&T Magazine*; programs; career information; events; training opportunities.

Army Training Requirements and Resources System

<https://www.atrrs.army.mil>

Army system of record for managing training requirements.

Assistant Secretary of the Army (Acquisition, Logistics & Technology)

<https://www.alt.army.mil>

ACAT Listing; ASA(ALT) Bulletin; digital documents library; links to other Army acquisition sites.

Association for the Advancement of Cost Engineering International

www.aacei.org

Planning and management of cost and schedules; online technical library; bookstore; technical development; distance learning.

Association of Old Crows

<https://www.myaoc.org>

News; conventions, courses; *Journal of Electronic Defense*.

Association of Procurement Technical Assistance Centers

www.aptac-us.org

PTACs nationwide assist businesses with government contracting issues.

Best Practices Clearinghouse

<https://bpch.dau.mil>

The authoritative source for acquisition best practices in DoD and industry. Connects communities of practice, centers of excellence, academic and industry sources, and practitioners.

Central Contractor Registry

<http://www.ccr.gov>

Registration for businesses wishing to do business with the federal government under a FAR-based contract.

Committee for Purchase from People Who are Blind or Severely Disabled

www.abilityone.gov

Information and guidance to federal customers on the requirements of the Javits-Wagner-O'Day (JWOD) Act.

Defense Acquisition Portal

<https://dap.dau.mil>

One-stop source for acquisition information and tools.

Defense Acquisition University and Defense Systems Management College

www.dau.mil

DAU iCatalog; DAU/DSMC course schedules; educational resources; and *Defense AT&L* magazine and *Defense Acquisition Review Journal*.

DAU Alumni Association

www.dauaa.org

Acquisition tools and resources; links; career opportunities; member forums.

Defense Advanced Research Projects Agency

www.darpa.mil

News releases; current solicitations; *Doing Business with DARPA*.

Defense Information Systems Agency

www.disa.mil

Defense Information System Network; Defense Message System; Global Command and Control System.

Defense Modeling and Simulation Coordination Office

<http://www.msco.mil>

DoD modeling and simulation master plan; document library; events; services.

Defense Spectrum Organization

<http://www.disa.mil/dso/>

Operational spectrum management support to the Joint Staff and COCOMs; conducts R&D into spectrum-efficient technologies.

Defense Technical Information Center

www.dtic.mil

DTIC's scientific and technical information network (STINET) is one of DoD's largest available repositories of scientific, research, and engineering information. Hosts over 100 DoD Web sites.

Department of Commerce, Defense Priorities and Allocations System

www.bis.doc.gov/dpas

DPAS regulation, policies, procedures, and training resources.

Deputy Chief Management Officer

<http://www.defenselink.mil/dcmo/index.html>

Information on the Defense Business Transformation Agency and the DoD Performance Improvement Officer.

Deputy Under Secretary of Defense for Acquisition and Technology

www.acq.osd.mil/at

Acquisition and technology organization, goals, initiatives, and upcoming events.

Director, Defense Procurement and Acquisition Policy

www.acq.osd.mil/dpap

Procurement and acquisition policy news and events; reference library; acquisition education and training policy, guidance.

DoD Defense Standardization Program

www.dsp.dla.mil

DoD standardization; points of contact; FAQs; military specifications and standards; newsletters; training; nongovernment standards; links.

DoD Enterprise Software Initiative

www.esi.mil

Joint project to implement true software enterprise management process within DoD.

DoD Inspector General Publications

<http://www.dodig.mil/PUBS/index.html>

Audit and evaluation reports; IG testimony; planned and ongoing audit projects of interest to the AT&L community.

DoD Office of Technology Transition

www.acq.osd.mil/ott

Information about and links to OTT's programs.

DoD Systems Engineering

<http://www.acq.osd.mil/sse>

Policies, guides and information on SE and related topics, including developmental T&E and acquisition program support.

Earned Value Management

www.acq.osd.mil/pm

Implementation of EVM; latest policy changes; standards; international developments.

Electronic Industries Alliance

www.eia.org

Government relations department; links to issues councils; market research assistance.

FAIR Institute

<http://www.thefairinstitute.org>

Organization that promotes a federal acquisition system that continually innovates, exceeds world class standards of performance, and ensures the prudent use of taxpayer dollars.

Federal Acquisition Institute

www.fai.gov

Virtual campus for learning opportunities; information access and performance support.

Federal Acquisition Jumpstation

<http://prod.nais.nasa.gov/pub/fedproc/home.html>

Procurement and acquisition servers by contracting activity; CBDNet; reference library.

Federal Aviation Administration

<http://fast.faa.gov>

Online policy and guidance for all aspects of the acquisition process.

Federal Business Opportunities

www.fedbizopps.gov

Single government point-of-entry for federal government procurement opportunities over \$25,000.

Federal R&D Project Summaries

<http://www.osti.gov/fedrnd>

Portal to information on federal research projects; search databases at different agencies.

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**Fedworld Information**

www.fedworld.gov

Central access point for searching, locating, ordering, and acquiring government and business information.

Government Accountability Office

<http://gao.gov>

GAO reports; policy and guidance; FAQs.

General Services Administration

www.gsa.gov

Online shopping for commercial items to support government interests.

Government-Industry Data Exchange Program

<http://www.gidep.org>

Federally funded co-op of government-industry participants, providing electronic forum to exchange technical information essential to life cycle development.

Integrated Dual-Use Commercial Companies

www.idcc.org

Information for technology-rich commercial companies on doing business with the federal government.

International Society of Logistics

www.sole.org

Online desk references that link to logistics problem-solving advice; Certified Professional Logistician certification.

International Test & Evaluation Association

www.itea.org

Professional association to further development and application of T&E policy and techniques to assess effectiveness, reliability, and safety of new and existing systems and products.

Joint Capability Technology Demonstrations

www.acq.osd.mil/jctd

JCTD's accomplishments, articles, speeches, guidelines, and POCs.

Joint Interoperability Test Command

<http://jitc.fhu.disa.mil>

Policies and procedures for interoperability certification; lessons learned; support.

Library of Congress

www.loc.gov

Research services; Copyright Office; FAQs.

MANPRINT (Manpower and Personnel Integration)

www.manprint.army.mil

Points of contact for program managers; relevant regulations; policy letters from the Army Acquisition Executive; briefings on the MANPRINT program.

NASA's Commercial Technology Office

<http://technology.grc.nasa.gov>

Promotes competitiveness of U.S. industry through commercial use of NASA technologies and expertise.

National Contract Management Association

www.ncmahq.org

Educational products catalog; publications; career center.

National Defense Industrial Association

www.ndia.org

Association news; events; government policy; *National Defense* magazine.

National Geospatial-Intelligence Agency

www.nima.mil

Imagery; maps and geodata; Freedom of Information Act resources; publications.

National Institute of Standards and Technology

<http://www.nist.gov>

Information about NIST technology, measurements, and standards programs, products, and services.

National Technical Information Service

www.ntis.gov

Online service for purchasing technical reports, computer products, videotapes, audiocassettes.

Naval Air Systems Command

www.navair.navy.mil

Provides advanced warfare technology through the efforts of a seamless, integrated, worldwide network of aviation technology experts.

Naval Research Laboratory

<http://www.nrl.navy.mil>

Navy and Marine Corps corporate research laboratory. Conducts scientific research, technology, and advanced development.

Naval Sea Systems Command

www.navsea.navy.mil

TOC; documentation and policy; reduction plan; implementation timeline; TOC reporting templates; FAQs.

Navy Research, Development, and Acquisition

<http://acquisition.navy.mil/rda>

Policy documents; career management; Acquisition One Source page, providing links to acquisition communities of practice.

Office of Naval Research

<http://www.onr.navy.mil>

News and announcements; publications and regulations; technical reports; doing business with the Navy.

Open Systems Joint Task Force

www.acq.osd.mil/osjtf

Open systems education and training opportunities; studies and assessments; projects, initiatives and plans; library.

Parts Standardization and Management Committee

www.dscc.dla.mil/programs/psmc

Collaborative effort between government and industry for parts management and standardization through commonality of parts and processes.

Performance-Based Logistics Toolkit

<https://acc.dau.mil/pbltoolkit>

Web-based 12-step process model for development, implementation, and management of PBL strategies.

Project Management Institute

<http://www.pmi.org>

Program management publications; information resources; professional practices; career certification.

Small Business Administration

www.sba.gov

Communications network for small businesses.

DoD Office of Small Business Programs

www.acq.osd.mil/osbp

Program and process information; current solicitations; Help Desk information.

Reliability Information Analysis Center

<http://theRIAC.org>

DoD-funded DTIC information analysis center; offers reliability, maintainability, quality, supportability, and interoperability support throughout the system life cycle.

Software Engineering Institute

www.sei.cmu.edu

Advances software engineering principles and practices as well as computer security, and process improvements.

Software Program Managers Network

www.spmn.com

Supports project managers, software practitioners, and government contractors. Contains publications on highly effective software development best practices.

Space and Naval Warfare Systems Command

<https://e-commerce.sscno.nmci.navy.mil>

SPAWAR business opportunities; acquisition news; solicitations; small business information.

System of Systems Engineering Center of Excellence

www.sosece.org

Advances the development, evolution, practice, and application of the system of systems engineering discipline across individual and enterprise-wide systems.

Under Secretary of Defense for Acquisition, Technology and Logistics

www.acq.osd.mil

USD(AT&L) documents; streaming videos; links.

U.S. Coast Guard

www.uscg.mil

News and current events; services; points of contact; FAQs.

U.S. Department of Transportation Maritime Administration

www.marad.dot.gov

Information and guidance on the requirements for shipping cargo on U.S. flag vessels.

Defense AT&L Writer's Guidelines in Brief

Purpose

Defense AT&L is a bi-monthly magazine published by DAU Press, Defense Acquisition University, for senior military personnel, civilians, defense contractors, and defense industry professionals in program management and the acquisition, technology, and logistics workforce. The magazine provides information on policies, trends, events, and current thinking regarding program management and the acquisition, technology, and logistics workforce.

Submission Procedures

Submit articles by e-mail to [datl\(at\)dau.mil](mailto:datl(at)dau.mil) or on disk to: DAU Press, ATTN: Carol Scheina, 9820 Belvoir Rd., Suite 3, Fort Belvoir VA 22060-5565. Submissions must include the author's name, mailing address, office phone number, e-mail address, and fax number.

Receipt of your submission will be acknowledged in five working days. You will be notified of our publication decision in two to three weeks.

Deadlines

Issue	Author Deadline
January-February	1 October
March-April	1 December
May-June	1 February
July-August	1 April
September-October	1 June
November-December	1 August

If the magazine fills before the author deadline, submissions are considered for the following issue.

Audience

Defense AT&L readers are mainly acquisition professionals serving in career positions covered by the Defense Acquisition Workforce Improvement Act (DAWIA) or industry equivalent.

Style

Defense AT&L prints feature stories focusing on real people and events. The magazine also seeks articles that reflect your experiences and observations rather than pages of researched information.

The magazine does not print academic papers; fact sheets; technical papers; white papers; or articles with footnotes, endnotes, or references. Manuscripts meeting any of those criteria are more suited to DAU's journal, *Acquisition Review Journal (ARJ)*.

Defense AT&L does not reprint from other publications. Please do not submit manuscripts that have appeared in print elsewhere. *Defense AT&L* does not publish endorsements of products for sale.

Length

Articles should be 1,500 – 2,500 words.

Format

Submissions should be sent via e-mail as a Microsoft® Word attachment.

Graphics

Do not embed photographs or charts in the manuscript. Digital files of photos or graphics should be sent as e-mail attachments or mailed on CDs (see address above). Each figure or chart must be saved as a separate file in the original software format in which it was created.

TIF or JPEG files must have a resolution of 300 pixels per inch; enhanced resolutions are not acceptable; images downloaded from the Web are not of adequate quality for reproduction. Detailed tables and charts are not accepted for publication because they will be illegible when reduced to fit at most one-third of a magazine page.

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Author Information

Contact and biographical information will be included with each article selected for publication in *Defense AT&L*. Please include the following information with your submission: name, position title, department, institution, address, phone number, and e-mail address. Also, please supply a short biographical statement, not to exceed 25 words, in a separate file. We do not print author bio photographs.

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